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OXIDE ORE GOLD EXTRACTION

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Report To

Lacana Gold Incorporated
Coeur d' Alene, Idaho

on

Column Leach Tests using Gilt Edge Gold Mine Ore at the Whitewood Canyon Test Site, Deadwood, S.D.

Project Number P-1045
January 18, 1985

Dawson Metallurgical Laboratories, Inc.
Murray, Utah

Abstract

Heap leach tests were made on samples of Gilt Edge ore. The gold extraction and calculated heads for the six tests are summarized in the following table:

Test No.	Test Conditions	Gold Extract. oz/Ton	Percent	Calculated Head oz/Ton
1	crushed to -3/4 inch	0.038	68.0	0.056
2	crushed to -3/4 inch and agglomerated	0.028	71.8	0.039
3	crush to -2 inch	0.034	70.8	0.048
4	mine run - minus 8 inch	0.026	74.2	0.034
5	composite sample - minus 2 inch	0.043	72.8	0.059
6	Test 3 second lift - minus 2 inch	0.041	74.6	0.055

Muck 7 -8" + 1½"

avg 72.03 .0435

Results of these tests define the parameter for a plant to treat ore similar to the samples tested. The proposed plant design includes agglomerating the ore after crushing to minus two inch and stacking in multiple 15 foot high lifts (the highest ore column tested was 2 lifts or 30 feet high, it may be possible to stack higher). Any proposed deviations will require further testing. Also, more tests are required for end of leaching cyanide neutralization.

Results of assay screen analyses showed that: (1) samples that were proposed to be crushed to minus 4 inch were in fact crushed to minus 2 inch due to a possible improper jaw crusher setting; (2) gold values were distributed through all size fractions of the head; (3) gold extraction was higher in the smaller size screen fractions than the coarse size screen fractions, and; (4) contrary to the results indicated by Test 4, only 29 percent of the gold was extracted from the minus 8 inch plus 1½ inch size fraction from the laboratory test made on Muck 7.?

Even though the gold extraction was similar for the ore samples tested they varied in their demand for cyanide, lime, and agglomeration. This variation made it difficult to select the correct cyanide and lime dosages. As a result the cyanide consumption ranged between 0.3 and 2.9 pounds per ton. Laboratory scoping tests were used to determine the amount of cyanide and lime to add to Tests 1 to 4. Tests 5 and 6 were started after the completion of Tests 1 to 4 and cyanide and lime were added based on their results. In Tests 5 and 6 the leach solution cyanide concentrations were close to the targeted 2 pounds per ton ?. and the cyanide consumption was 0.4 and 0.3 pounds per ton of ore. Tests 5 and 6 consumed 1.8 and 2.7 pounds of lime respectively; however, the resulting leach solution pH's were too low, therefore, 3.3 and 2.7 pounds of caustic were added to Tests 5 and 6, respectively.

Tests 1 to 4 consumed between 1.1 and 1.7 pounds of lime per ton.

The ore samples varied in their need for agglomeration. Limited percolation of solution through Test 5 indicated that the composite sample tested should have been agglomerated. Agglomeration did not

appear to be required for the other samples tested.

Extracted gold was recovered on activated carbon.

Residual cyanide in the leach residue was reduced by oxidation with calcium hypochlorite. The weak acid dissociable cyanide concentration in the heap effluent solutions were reduced to as low as 0.6 mg per liter More tests are required to define both a reliable approach for cyanide neutralization and subsequent analysis.

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I. Introduction

In the summer of 1984 six heap leach tests were made on Gilt Edge Mine ore in the columns located in Whitewood Canyon near Deadwood, S.D. The results of these tests are given in this report. A limited number of tests were made in our laboratory in Salt Lake City prior to and during the Whitewood Canyon tests.

The results of these tests can be used to design a full scale plant to treat ores similar to the samples tested. The plant should be designed to agglomerate ore crushed to minus 2 inch and stacked in multiple 15 foot high lifts. If the plans deviate from this proposal then more testing will be required in the areas of protective alkalinity and the need for agglomeration.

Lacana Gold, Inc. personnel managed the mining, crushing, and hauling of the samples for the Whitewood Canyon tests.

After the samples were delivered to the test site in Whitewood Canyon, Dawson Metallurgical Laboratories assumed the responsibility for the metallurgical testing. Lacana Gold, Inc. requested that heap leach tests be made for the following conditions: Heap depths of 15 and 30 feet; ore samples crushed to: minus 3/4 inch and then agglomerated; minus 4 inch and; mine run (minus 8 inch). Target conditions for the leach solutions were: 2 pounds of NaCN per ton; pH of 10.2, and; flow rate of 0.004 gallons per minute per square foot (260 liters per day).

A few scoping tests were run in Salt Lake City to help define the initial cyanide and lime concentrations. Results of these tests indicated that 3.6 pounds of cyanide and 1.2 pounds of lime per ton would be consumed. The character of the ore varied so that the addition of 3.6 pounds of cyanide produced leach solutions with cyanide concentrations that varied from 20 to 7 pounds per ton for Tests 1 to 4. Tests 5 and 6 were started after Tests 1 to 4 were complete and the cyanide concentration in the leach solution was maintained near 2 pounds per ton.

The ore samples tested varied widely in the amount of lime required for cyanide protective alkalinity. The target pH for all tests except 2 was 10.2. The lime added to Tests 1, 3, and 4 as indicated by the scoping tests, was inadequated to maintain the target pH but high enough that additional lime was not added. The lime dosage was increased for Tests 5 and 6 however, the resulting pH was lower than in the preceeding tests. A drastic approach of adding caustic to raise the pH was used. why so drastic

The protective alkalinity for Test 2 was provided by the cement used for agglomeration. The resulting leach solution pH's were above 11 which is typical for an agglomerated heap leach.

The variety in the character of the ore effected the need for agglomeration. The sample for Test 2 was crushed to minus 3/4 inch and agglomerated. None of the other samples were agglomerated. Percolation was not a problem except in Test 5 (composite sample crushed to minus 2 inch) where the solution ponded on the surface throughout the test.

It appears that the need for agglomeration may vary through the ore body.

The target for Tests 3, 5, and 6 was crushed to "minus 4 inch". A screen analysis on the leach residue of Test 5 showed that the actual size was minus 2 inch. The reason for this was the setting on the jaw crusher was not properly set. In addition to the tests at the Whitewood Canyon test site, a head sample of "Muck 7" was shipped to the Dawson Metallurgical Laboratory in Salt Lake City where an assay screen analysis was made. Also, a heap leach test was made in a 55 gallon drum on minus 8 inch plus 1 ½ inch fraction of the sample. The results of this test were used to calculate both the head grade for the size fraction and the percent of extractable gold.

II. Summary of Whitewood Canyon Test Results

Six heap leach tests were made on ore samples from the Gilt Edge Mine. The four columns, four foot in diameter by forty feet high were loaded with about ten tons (fifteen feet deep in the column) for each test. The ore for Test 6 was stacked on top of Test 3 so the combination was about 20 tons and about 30 feet deep. The samples used for the respective tests are listed on the following page.

1. Test Results

The table on the following page gives the overall results of the heap leach tests. The complete results that show daily gold extraction and cyanide solution strength are given in the appendix.

2. Comparison of Solution Assays and Carbon Recovery Results

Pregnant leach solutions were assayed daily and the results were used to calculate the gold extraction. At the end of leaching the carbon circuits used for gold recovery were assayed. A comparitive summary for the gold extraction for the two results is given in the following table. Detailed results for carbon circuit assay and solution assays are given in the appendix.

Comparison of Solution Assay and Carbon Assay Results

Test	Gold Extraction, oz Au/ton Ore	
	Solution Assay	Carbon Assay
1	0.038	0.040
2	0.028	0.024
3	0.034	0.037
4	0.026	0.033
5	0.043	0.035
6	0.041	0.036

These results are in agreement within the limits of solution assay accuracy. The largest discrepancy was in Test 5 - 0.043 oz/ton by solution assay of 0.035 oz/ton by carbon assay. One problem that contributed to this discrepancy was that during the first week of leaching the pH of the solution was too low to protect the cyanide and so caustic

Leach Test Results - Gilt Edge Ore
Whitewood Canyon Tests

Test	Crush	Leach Time, Days	Assay, oz Au/ton		Extraction	Reagents Consumed, lbs/ton		
			Residue	Head (calc)*	Percent*	NaCN	Lime	Caustic
1	-3/4 inch	38	.018	.056	68.0	2.8	1.4	
2	-3/4 inch - Agglomerated	32	.011	.039	71.8	0.8	(10 lbs Cement/T)	
3	minus 2 inch	32	.014	.050	70.8	2.9	1.7	
4	mine run (-8")	38	0.008	0.034	76.8	2.5	1.1	
5	composite sample minus 2 inch	47	0.016	0.059	72.8	0.4	1.8	3.3
6	minus 2 inch (on top of Test 3)	47	.014	.055	74.7	0.3	2.7	2.1
					72.03			
					72.8			

* Extraction percents and calculated heads are based on solution assays.

Ore Samples and Their Respective Test Numbers

Test 1	Muck 8 and 9
Test 2	Muck 15
Test 3	Muck 11
Test 4	Muck 12
Test 5	Composite of All
Test 6	Muck 30 and 7

was added to raise the pH; as a side effect a precipitate formed that blocked the flow through the carbon circuit. Assay results indicated that the precipitate was possibly a sodium (?) calcium silicate, assaying 3.54 oz Au/ton, that encapsulated a portion of the values. Assuming the protective alkalinity in a production heap leach were similarly too low and were raised with caustic it is probable that a similar precipitate would form. It is likely that such a precipitate would block the carbon circuit and it is possible that it would severly reduce percolation of leach solution through the heap.

3. Assay Screen Analyses

A head sample from "Muck 7" and samples of all the leach residues were shipped to Dawson Metallurgical Laboratories in Salt Lake City for sampling and assay. Assay screen analyses were made on three samples: (1) "Muck 7" (mine run) head sample; (2) Test 1 (minus 3/4 inch) leach residue, and; (3) Test 5 (composite ore sample - minus 2 inch).

The following table summarizes the results of these tests.

Assay Screen Analyses Gold Assays

	Muck 7 Head Mine Run			Test 5 Leach Residue Composite Minus 2 inch Head Assay 0.059 oz/T			Test 1 Leach Residue -3/4 inch Head Assay 0.056 oz/T		
Size Fraction	WT %	Assay	Dist.%	WT %	Assay	Dist.%	WT %	Assay	Dist.%
-8 +1½ inch	41.77	0.05	41.43						
+3 inch				0.1	0.016	0.1			
-3 +2 inch				3.1	0.012	2.4			
-2 +1 inch				18.7	0.016	19.3			
-1½ +3/4 inch	8.47	0.024	4.03						
-1 +3/4 inch				6.2	0.020	8.0			
-3/4 +½ inch				7.2	0.010	4.7			
-3/4 +3/8 inch	8.00	0.030	4.76						
-½ +3/8 inch				2.5	0.013	2.1			
-3/8 +1/4 inch	6.33	0.021	2.64	9.4	0.014	8.5			
-1/4 +10 mesh	15.94	0.032	10.12	21.9	0.010	14.1			
-3/4 inch +10 mesh							64.7	.016	55.33
-10 +35 mesh	9.21	0.038	6.94	12.1	0.014	10.9	17.6	.016	15.06
-35 +65 mesh				4.4	0.016	4.5	4.5	.020	4.84
-35 +100 mesh	3.27	0.064	4.15						
-65 +100 mesh				1.8	0.037	4.3	1.7	.023	1.95
-100 mesh	7.03	0.186	25.94	12.6	0.026	21.1	11.5	.037	22.81
Head/Tail (calc)	100.0	0.051	100.0	100.0	0.016	100.0	100.0	.015	100.0

These results show gold values through all screen sizes and a significant increased concentration in the minus 65 mesh sizes of both the head sample and the leach residues. Even though the minus 65 mesh fractions assayed about 0.03 oz Au/ton the gold extraction was probably greater than 75 percent.

The results for Test 4 that indicate 76.8 percent extraction, are incomplete and perhaps misleading. A heap leach test was made on the

minus 8 inch plus 1½ inch size fraction of "Muck 7" in the laboratory in Salt Lake City. As the above table indicates this fraction accounted for 41.8 percent of the sample weight and 41.4 percent of the gold. The table on the previous page compares the gold and weight distribution of the "Muck 7" head with the leach residues for Tests 1 and 5. The leach test results for the minus 8 inch plus 1 ½ inch size fraction of "Muck 7" were used to calculate the head assay and to determine the amount of extractable gold for the size fraction. The sample was leached for 30 days. A summary of these test results follow:

Leach Results for "Muck 7" minus 8 plus 1½ inch

Product			Extraction,	Reagents Consumed, lbs/T	
	Residue	Head (calc)	Percent	NaCN	Lime
Muck 7					
-8 +1½ inch	0.036	0.050	29.1	1.5	5.6

The complete conditions and results for this test are included in the appendix.

4. Gold Extraction vs Time

The results of the gold extraction as calculated from the pregnant solution assays was plotted vs time in Figures 1 and 2. Figure 1 illustrates gold extraction vs time for all six tests. Figure 2 is the same as Figure 1 except only the results of Tests 3, 5, and 6 where the samples were crushed to minus 2 inch, are illustrated.

These plots illustrate that the gold was extracted faster in Tests 1 through 4 than Tests 5 and 6. A reason for this may have been the high concentration of cyanide in the leach solutions for Tests 1 through 4. The fastest gold extraction was from Test 1 where ore had been crushed the smallest, minus 3/4 inch.

The curve for Test 6 is the typical shape for gold extraction from a second lift heap leach indicating that ores similar to the samples tested in Tests 3 and 6 can be leached in multiple 15 foot high lifts up to 2 lifts (or 30 feet high). It is possible that multiple lifts higher than 30 feet can be used.

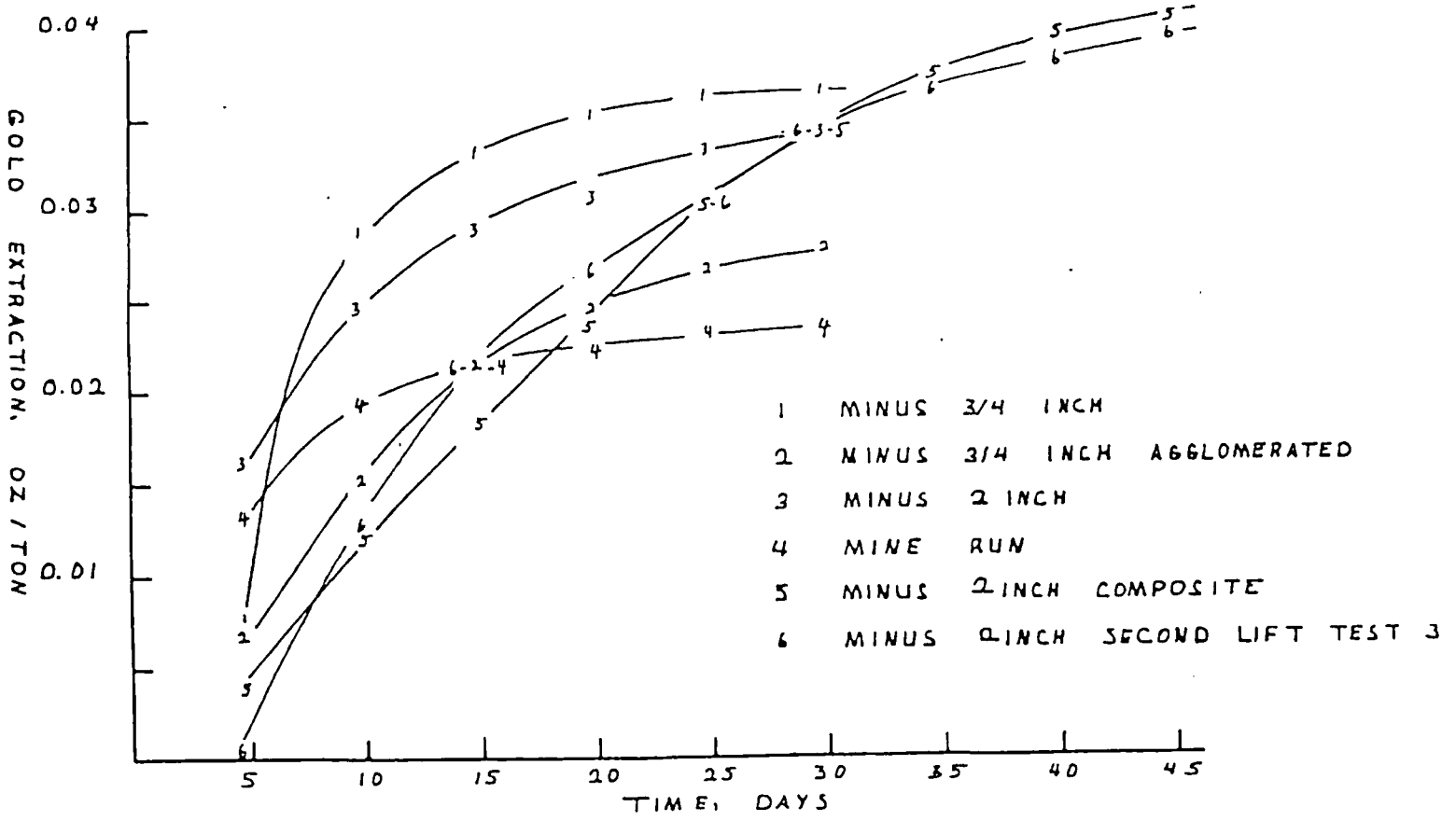
5. Gold Recovery from Carbon Columns

The carbon circuit for each test was made of five separate carbon columns arranged in series. Each carbon circuit was assayed to determine the amount of gold that had been recovered. The complete results of those assays are given in the appendix.

The carbon circuit for Test 6 was the only one that had all five carbon columns in the circuit for the full duration of the test. The carbon loading profile for the circuit was:

Test 6 Carbon Circuit - Carbon Loading Profile

Stage	Loading, oz/Ton	
	Au	Ag
1	103.3	11.8
2	40.3	9.4
3	7.6	6.1
4	1.3	2.1
5	0.3	0.6



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GILT EDGE WHITEWOOD CANYON TESTS
GOLD EXTRACTION VS. TIME
TESTS 1-6

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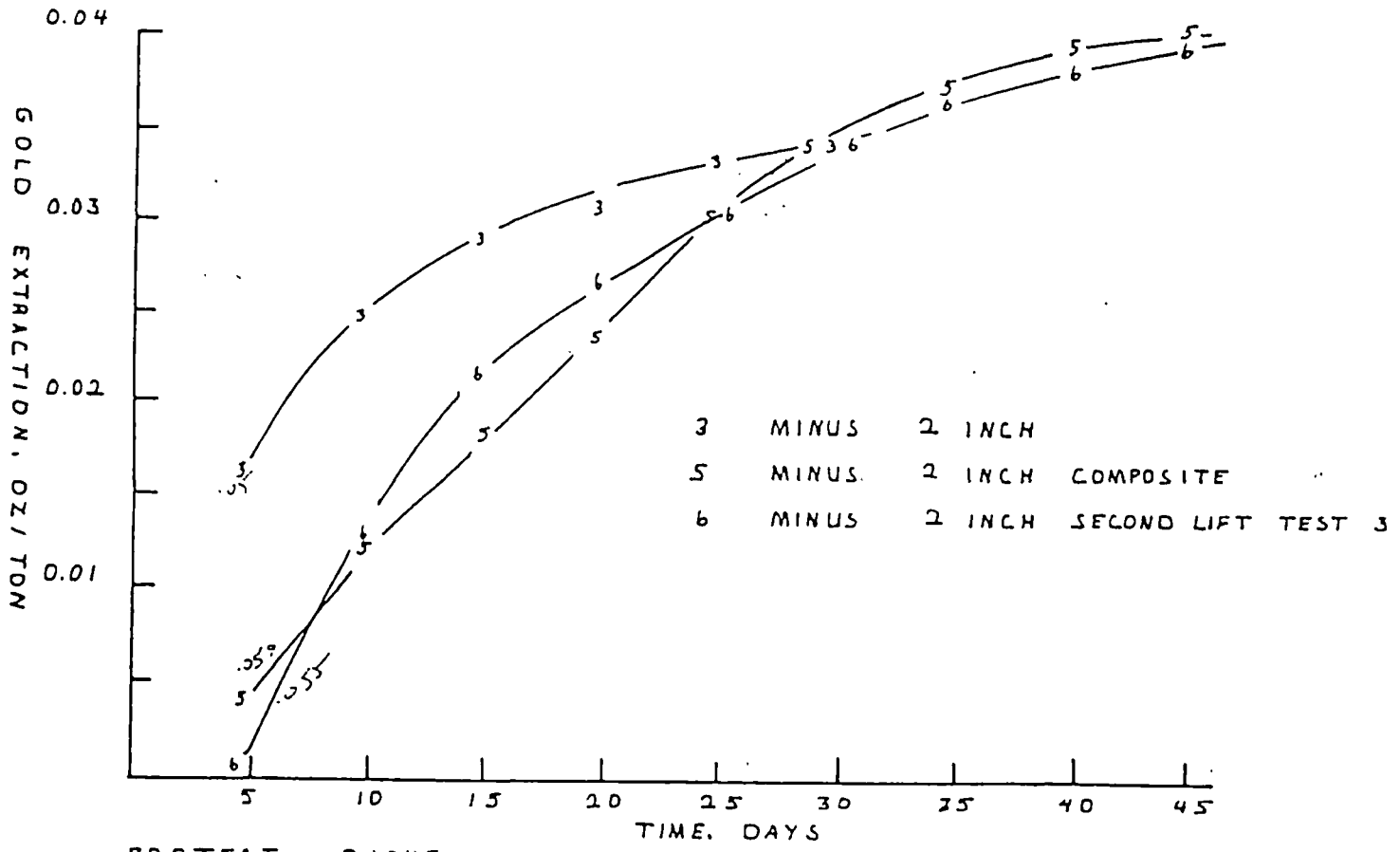

PROJECT P 1045
LACANA GOLD INC
GILT EDGE WHITEWOOD CANYON TESTS
MINUS 4 INCH SAMPLES
GOLD EXTRACTION VS. TIME
TESTS 3, 5, AND 6

DML
WRM
11/16/84

Much higher loading is possible. These results show that ratio of gold to silver loaded on the carbon decreases with increasing stage number. This indicates that gold displaces loaded silver. The silver is then readsorbed in the next stage. If carbon is loaded higher the effect of gold displacing silver will increase. If the silver is to be recovered in a plant operation where the carbon loads similar to this test, the carbon flow will have to be split and carbon will be taken from stages 1 and 2 for stripping.

6. Cyanide Consumption

The cyanide consumption was high in Tests 1, 3, and 4 where leach solutions had high cyanide concentrations. The table below summarizes cyanide consumption and leach solution cyanide strength.

Summary of Cyanide Strength and Cyanide Consumption

Test	Leach Solution Cyanide, lbs/T Solution		Cyanide Consumed, lbs/ton Ore
	High	Low	
1	13.0	7.5	2.8
2	10.2	6.6	0.8
3	20.1	7.9	2.9
4	19.9	7.5	2.5
5	2.1	0.1	0.4
6	2.0	1.7	0.3

It appears that a plant treating ores similar to these could be leached with cyanide solutions with concentrations below 2 pounds per ton. More testing is needed.

7. Lime and Caustic

Protective alkylinity was added to Tests 1, 3, and 4 as lime at about 1.2 pounds per ton. The target pH was 10.2; however, the leach solution pH's ranged between 9.4 and 10.4. Probably only small amounts of cyanide were lost because of low pH's.

Tests 5 and 6 required more lime and in addition caustic was added. The lime dose was increased to 1.8 pounds per ton added with the ore. The pH of the leach solution was too low so more lime was added to the leach solution. The pH increased too slowly by lime additions to the leach solution so caustic was added. The caustic increased the pH but caused the formation of a sodium (?) - calcium silicate that caused mechanical problems in the test operation.

8. Agglomeration

The sample for Test 2 was crushed to minus 3/4 inch and agglomerated. The results given above show that 71.8 percent of the gold was extracted (0.028 oz/ton from a 0.039 oz/ton head) and that the residue contained only 0.011 oz Au/ton.

Lowest residual gold test

Percolation through Test 5 (minus 2 inch composite sample) was a problem as solution ponded on the surface after 6 days and persisted throughout the test. Agglomeration of the sample would have improved percolation. If the ore body contains much ore similar to this composite sample then agglomeration will probably be required.

9. Leach Solution Reducing Power and Thiocyanate Concentration

The reducing power and thiocyanate concentrations were low in two samples tested: The results were:

Leach Solution R.P. and SCN^-

Sample	Reducing Power ml .1 N $KMNO_4$/l	Potassium Thiocyanate, g/l
Test 3 P-4	30	3
Test 4 Final Barren	<10	<.2

This means that the leach solutions did not build up any compounds that react with oxygen dissolved in solution and there by retard the cyanide leaching rate.

10. Apparent Bulk Density

The apparent bulk density for the beginning of each test is listed in the following table.

Apparent Bulk Density

Test Number	Ore Dry Weight, lbs	Depth, Inches	Volume, Cu Ft	Bulk Density, lbs/Cu Ft	
1	18678	204	213.6	87.4	22.8 ft³/ton
2	21312	237	248.2	85.9	23.3
3	17727	192	202.1	87.7	22.8
4	21130	204	213.6	98.9	20.2
5	21263	218	228.3	93.1	21.5
6	37797	379	396.9	95.2	21.0

21.8 ft³/ton

The samples compacted during leaching and increased the apparent dry weight bulk density by about 3 percent.

11. Cyanide Neutralization with Hypochlorite

The residual cyanide left in the leach residue was neutralized with hypochlorite - caustic solution. A list of some of the reactions involved in the complex chemistry of cyanide oxidation is given in the appendix. This list shows that caustic is important to the balance of the oxidation reaction. The target pH of 10 + was not reached in any of the tests. A summary of these tests is given in the table on the following page.

Results of Cyanide Neutralization with Hypochlorite

Test No.	Time, Days	HTH[1] used, lbs/T Ore	NaOH used, lbs/T Ore	WAD[2] Cyanide Concentration Start lbs/T Soln	Finish mg/l
1	20	5.2	1.9	6.1	3.7
2	5	3.2	---	6.6	1.7
3-6	20	1.8	0.8	1.7	0.65
4	14	6.6	0.5	6.4	0.75
5	10	1.2	0.7	1.4	0.64

1 66.25% $Ca(OCl)_2$
2 Weak Acid Dissociable

Final solutions were analyzed by three laboratories: Travis Laboratories, Rapid City, S.D.; UBTL, Salt Lake City, Utah; and Hibbs Laboratories, Boise, Idaho.

The following table shows the results from each laboratory for samples with more than one analyst.

Comparison of Results From Three Analysts

Sample Number	Analysis, WAD[1] Cyanide, mg/l		
	Travis Labs.	Hibbs	UBTL
Test 4 Sample B	103	115	----
Test 4 Sample G	0.75	21	----
Test 5 Sample C	0.64	1.07	----
Test 6 Sample B	0.65	2.67	270
Test 7 Sample A[2]	.005	----	.13

1 Weak Acid Dissociable
2 Deadwood City Water with 5 g HTH and 2½ Caustic per liter

The results in this table indicate the need for further testing in two areas: (1) process development to outline a reliable approach for cyanide neutralization, and; (2) analysis.

III. Test Procedures

Six tests were made in the forty foot high columns located on the Hoffman Property in Whitewood Canyon. One operator, Curtis Gene Cunningham, was on site for the entire period. Other labor was employed to complete individual tasks as required.

1. Sample Preparation

Ore samples were hauled from the mine and crushed by Lacana personnel. Samples crushed to minus 3/4 inch were crushed with crushers and screens arranged in closed circuit. The final screen size was 3/4 inch by 5/8 inch.

Ore samples crushed to minus 2 inch were screened at 3/4 inch. The plus 3/4 inch ore was crushed to minus 2 inch with a single pass through the jaw crusher. This procedure segregated the ore. The effects of this segregation were greatly reduced by loading all of the screened and crushed sample into the leach column. The samples were weighed at Twin City Transfer.

A. Agglomeration - Test 2

The sample for Test 2 was crushed to minus 3/4 inch and agglomerated in a 3 cubic yard ready-mix concrete truck. One ton batches were weighed and charged into the mixer with 10 pounds of Portland Type I cement, 3.6 pound of sodium cyanide, and the water required for agglomeration.

2. Ore Storage

After the ore was prepared for leaching, each sample was stacked separately on Hypalon ground cloths and covered with clear polyethylene plastic sheeting. The ore was handled carefully to minimize any loss or dilution.

3. Column Drainfield

The leach columns were constructed with an access hole six inches above the bottom. The space below the access hole was used as a drain field. The drain field was made of 4 inch flexible drain pipe covered with 3/4 inch washed gravel.

4. Column Loading and Unloading

Ore samples were charged into their respective columns by hoisting a bucket containing about 1500 pounds of ore to the top of the column with a crane. The bucket was lowered to the bottom of the column and dumped. Lime for protective alkalinity was added to each bucket of ore. "Grab" samples were taken from each bucket and assayed. The results of these assays were reported in the interim reports. Copies of all interim reports are included in the appendix. The following table compares the results of average of all the grab samples with the results of the calculated heads from the solution assays of the leach tests.

Comparison of Assays of Grab Samples with Calculated Heads

Test Number	Grab Sample Head Assay oz Au/ton	Calculated Head* oz Au/ton
1	0.053	0.056
2	0.043	0.039
3	0.052	0.050
4	0.042	0.034
5	0.051	0.059
6	0.043	0.055

* Based on Solution Assays

Burlap cloth was spread on the top of the ore in each column to help distribute the solution flow over the entire area. The solution was distributed on the burlap through a closed loop of perforated surgical tubing.

Leach residues were removed through the access hole.

5. The Leach Circuit

The leach circuit was designed to simulate a heap leach operation and provide the necessary control for sampling and evaluation of each test. The four leach columns were equipped the same but independant of each other. Each circuit consisted of: (1) a four foot diameter by forty foot high column with the ore sample; (2) two, 110 gallon capacity pregnant solution day tanks; (3) carbon circuit consisting of five 4 inch diameter by 24 inch high columns each containing 5 pounds of Westates 12 x 30 activated carbon; (4) one, 110 gallon capacity barren solution tank; and, (5) three Cole-Parmer Master Flex variable speed pumps - one to pump pregnant solution from the drainfield to the pregnant solution day tanks - one to pump pregnant solution through the carbon circuit into the barren tanks - one to pump barren solution onto the surface of the column. Figure 3 shows the leach circuit.

6. Leach Conditions

The leach conditions were planned to meet the criterion of an operating plant. Reagent additions were based on the results of the limited number of our previous tests that were made in the laboratory in Salt Lake City.

A. Leach Solution Cyanide Strength

All of the cyanide for Tests 1 to 4 was added at the start of tests. In Tests 1, 3 and 4 it was added in the leach solution and in Test 2 it was added as solution for agglomeration. The concentration added, 3.6 pounds of NaCN per ton, was the amount consumed in the scoping tests. By adding the amount of cyanide that the ore consumes at the beginning of the leach the gold extraction rate is increased. However, because of the unexpected wide variation in the ore sample 3.6 pounds of NaCN per ton was excessive and yielded pregnant and barren solutions that contained as high as 20 pounds of NaCN per ton. This probably contributed to the high cyanide consumption in these tests, but did not adversely affect the gold extraction.

The cyanide was added to Tests 5 and 6 by maintaining the concentration in the leach solution near 2 pounds NaCN per ton. It is doubtful that the difference in cyanide strength had an effect on the overall gold extraction.

B. Protective Alkalinity

The target pH for the leach solution was 10.2. Again the wide variation in the characteristic of the samples made it difficult to maintain the

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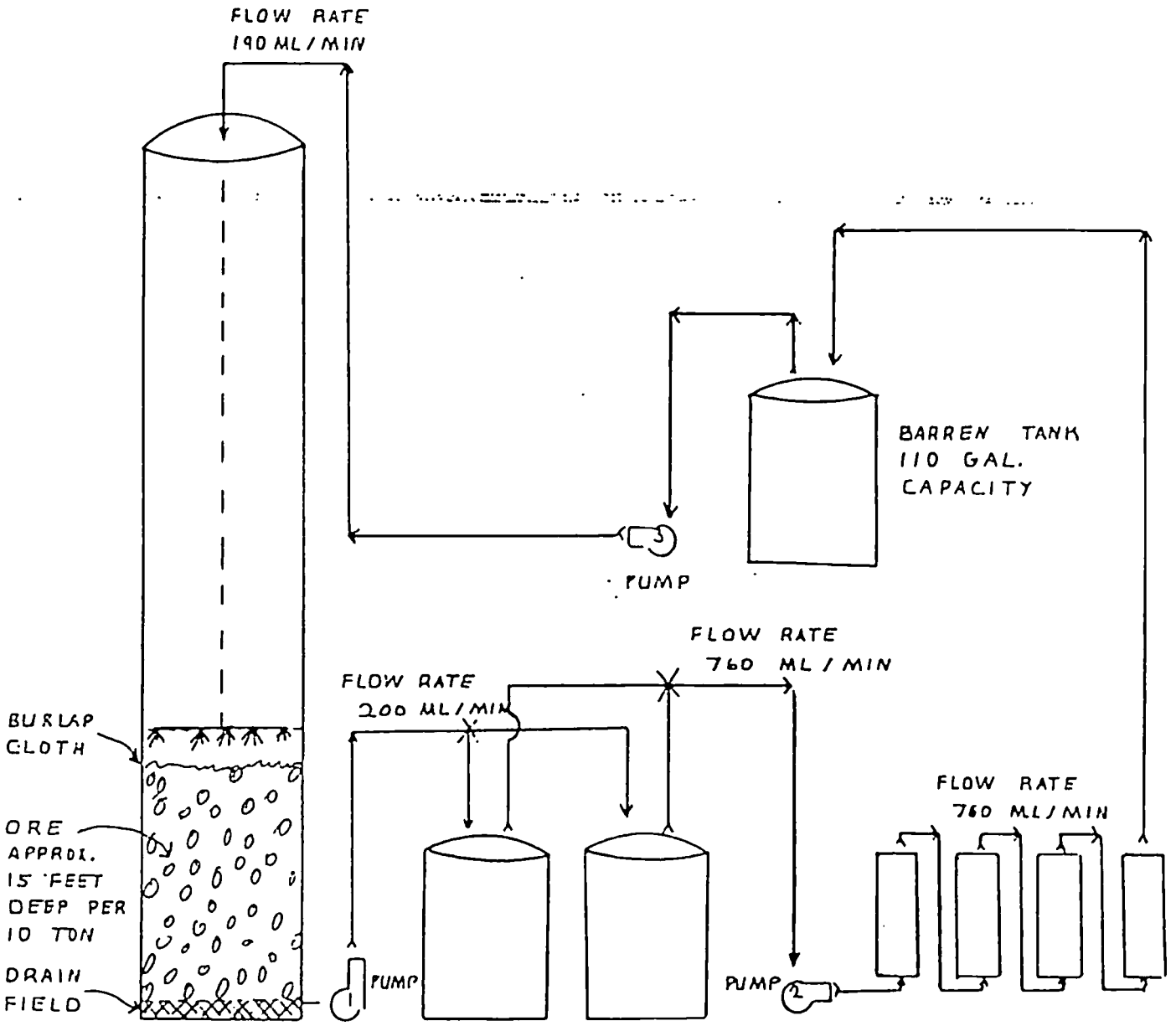
LEACH CIRCUIT FLOW SCHEME



CONCRETE COLUMN
4 FOOT DIA. BY
40 FOOT HIGH

PREGNANT SOLUTION
DAY TANKS TWO EACH
110 GAL. CAPACITY

CARBON CIRCUIT
FOUR COLUMNS
4 INCH DIA. BY
24 INCH HIGH
WESTATES 12X30
ACTIVATED CARBON
5 POUNDS EACH
COLUMN

PUMPS 1 AND 3
COLE - PARMER
MASTER FLEX
DRIVE T- 7533
HEAD 7018
PUMP 2
MASTERFLEX
T- 7549 - 39

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proper pH. Lime doses of 1.2 pounds per ton were added with the ore for Tests 1, 3, and 4 as the columns were loaded. The resulting leach solution pH's were about 10 but ranged between 9.2 and 10.4. Probably only small amounts of cyanide were lost because of low protective alkalinity. In Test 2 the protective alkalinity was controlled by the addition of 10 pounds of cement per ton and the resulting pH's were above 11.

The lime added with the ore for Tests 5 and 6 was increased to 1.8 pounds per ton. The effluent solution from Test 5 had a pH between 7.4 and 8. One-half pound of lime per ton ore was added during the next 5 days by saturating the leach solution with lime. The pH increased too slowly so 3 1/3 pounds of caustic were added over the next four days and the effluent pH increased to above 12.

Similarly 2 pounds of caustic per ton ore were added to Test 6.

C. Solution Flow

The target solution flow rates were 190 ml/min. (260 liters per day-about 0.004 gallons per minute per square foot) for the feed leach solution, 200 ml/min. for the pregnant solution (to avoid any build-up of solution in the drain field) and 760 ml/min. for the carbon circuit foot pump (2.3 gallon per minute per square foot and about 4 1/3 minute retention time).

7. Solution Samples

The pregnant solution was pumped from the drain field to one of two day tanks where it was collected for 24 hours. Each day one tank was filled and one tank was emptied by pumping the pregnant solution through the carbon circuit. Each day the tanks were alternated. The volume of pregnant solution was measured, sampled, and assayed each day. Duplicate samples were saved for future reference.

The barren solutions were sampled daily and a daily composite of all tests was made and assayed. Assay results showed "none found" so it was not necessary to assay the individual barren solutions.

8. Leach Residue Samples

The leach residues were taken to a warehouse adjacent to the leach columns for preliminary sample preparation. The residue from Test 4 (mine run) was crushed to minus 1½ inch and then representative samples of about 1400 pounds were obtained by mixing the residue, cone and quartering, and rejecting halves as opposite quarters. These samples were put in 55 gallon drums and shipped to Salt Lake City. Similar samples were obtained from the other tests, except: (1) they were not crushed prior to mixing and cone and quartering; and, (2) the sample for Test 5 (minus 2 inch composite) weighed about 2200 pounds.

All of the sample from Test 5 that was shipped to Salt Lake City was used for an assay screen analysis.

The samples from the other tests were dried and crushed. Samples for assay were obtained by coning and quartering and then splitting.

IV. Discussion

The results of the available test results can be used to design a production heap leach. The results indicate that the ore should be crushed to minus 2 inch, agglomerated, stacked in heaps of multiple lifts with individual lifts of 15 feet high (even though only single - 15 feet - and double - 30 feet - lifts were tested it is probable the much higher heaps can be built), and leached with solutions containing 2 pounds of sodium cyanide per ton. If these criteria are used for plant design then continued laboratory or pilot plant testing on these samples would probably add only limited new useful data. However, any deveations will require more testing. If no further tests are made then once a plant operation is started it may be possible to reduce the cyanide concentration in the leach solution and gain the advantage of lower cyanide consumption and lower residual cyanide in the leach residue that will need neutralization.

The ponding of the leach solution on the surface of Test 5 (composite sample - minus 2 inch) may indicate that agglomeration will be required in the plant operation. Agglomeration offers other benefits in addition to improving percolation: (1) the cement for agglomeration provides protective alkalinity so that the risk of large gold losses in production heaps as a result improper pH control is greatly reduced. (Any production heap that is under dosed with lime - similar to Test 5 - could result with very high gold losses. Although the pH can be increased by the addition of caustic to the leach solution it causes the formation of precipitates that stop percolation through the heap and through the carbon circuit and the addition of cyanide during agglomeration initiates early leaching with a resulting increase in the overall rate of extraction.

The results of the assay screen analyses provide some of the most valuable information in the test. These results show that head material has gold distributed through all size fractions. The screen analyses on the Test 5 leach residue showed that the targeted minus 4 inch crush was actually minus 2 inch and the assays showed that the unleached gold in the coarse fractions (plus 35 mesh) was about the same as the average assay for the leach residue. These results and the results of a leach of the minus 8 inch plus 1½ inch fraction where only 29 percent of the gold was extracted indicate that the ore should be crushed to minus 2 inches in a plant operation.

A comparison of the results of Test 3 (minus 2 inch stacked 15 feet deep) and Test 6 (second lift on Test 3 - minus 2 inch total depth 30 feet) shows an improvement in both the head grade and the percent gold extraction in Test 6. It is likely that as the pregnant leach solution from Test 6 percolated through the leach residues of Test 3 to the drain field that some additional gold was extracted from Test 3. Any additional gold that was extracted was reported as though it originated in Test 6 and the result would show a higher than actual gold extraction and calculated head.

Neutralization of the residual cyanide in the leach residue is probably the area in need of more tests. The target residual weak acid dissociable cyanide concentration of 0.2 mg CN/liter was not reached, and this was probably related to not reaching the target operating pH of 10 +. More testing is required to define a process that will both reach the final residual cyanide concentration and reduce the time required to reach it.

Very truly yours,
DAWSON METALLURGICAL LABORATORIES, INC.

W Richard McDonald

W. Richard McDonald,
Consulting Metallurgist

WRM-cac

Project Number P 1045
Lacana Gold Inc
Giltedge
Column Number 4
Mine Run
Weight = 21130lbs.

Flowrate, weight .034 gpm/ft² = 261 liters/day
~ 131 ml/min

Date	Sample	Liters	Oz Au/Ton	Oz Au	Cum Oz Au	Cum Oz Au/Ton	Au Dist
8/15/84	Start						
8/19/84	P-1	326	.286	.1027	.1027	.0097	
8/20/84	P-2	182	.203	.0407	.1434	.0136	
8/21/84	P-3	182	.129	.0259	.1692	.0160	
8/22/84	P-4	235	.052	.0135	.1827	.0173	
8/23/84	P-5	182	.042	.0084	.1911	.0181	
8/24/84	P-6	235	.02	.0052	.1963	.0186	
8/25/84	P-7	261✓	.012	.0034	.1997	.0189	
8/26/84	P-8	166	.034	.0062	.2059	.0195	
8/27/84	P-9	213	.036	.0084	.2144	.0203	
8/28/84	P-10	212	.016	.0037	.2181	.0206	
8/29/84	P-11	234	.024	.0062	.2243	.0212	
8/30/84	P-12	169	.043	.0080	.2323	.0220	
8/31/84	P-13	221	.026	.0063	.2386	.0226	
9/1/84	P-14	130	.017	.0024	.2411	.0228	
9/2/84	P-15	205	.018	.0041	.2451	.0232	
9/3/84	P-16	176	.025	.0048	.2500	.0237	
9/4/84	P-17	195	.013	.0028	.2528	.0239	
/5/84	P-18	173	.012	.0023	.2551	.0241	
9/6/84	P-19	228	.016	.0040	.2591	.0245	
9/7/84	P-20	288A	.011	.0035	.2626	.0249	
9/8/84	P-21	195	.008	.0017	.2643	.0250	
9/9/84	P-22	222	.005	.0012	.2655	.0251	
9/10/84	P-23	261✓	.005	.0014	.2670	.0253	
9/11/84	P-24	238	.003	.0008	.2677	.0253	
9/12/84	P-25	254	.001	.0003	.2680	.0254	
9/13/84	P-26	241	.004	.0011	.2691	.0255	
9/14/84	P-27	195	.003	.0006	.2697	.0255	
9/15/84	P-28	143	.001	.0002	.2699	.0255	
9/19/84	P-29	104	.003	.0003	.2702	.0256	
9/24/84	P-30	261✓	.0095	.0027	.2730	.0258	
9/25/84	P-31	222	.007	.0017	.2747	.0260	
9/26/84	P-32	261✓	.007	.0020	.2767	.0262	
9/27/84	P-33	248	.002	.0005	.2772	.0262	
9/28/84	P-34	156	.008	.0014	.2786	.0264	
10/3/84	P-35	274A	.004	.0012	.2798	.0265	

PROJECT P-1045
LACANA GOLD INCORPORATED
GILT EDGE
CYANIDE SOLUTION SUMMARY
TEST NUMBER 4
ORE WEIGHT = 21130lbs.

DATE	Time	NaCN Added	SAMPLE	Tank Depth	Liter	PREGNANT SOLUTION NaCN lbs/ton	pH
8/15/84	2:00p	10 lbs	Start				
8/17/84	8:00a	10 lbs					
8/18/84	8:00a	10 lbs					
8/19/84	8:00a		P-1	25.00	326	7.4	9.2
8/20/84	8:00a		P-2	14.00	182	14.1	10
8/21/84	8:00a		P-3	14.00	182	19.9	10
8/22/84	8:00a		P-4	18.00	235	15	10.2
8/23/84	8:00a		P-5	14.00	182	15.6	10.1
8/24/84	8:00a		P-6	18.00	235	14.8	10.2
8/25/84	8:00a		P-7	20.00	261	15.7	10.2
8/26/84	8:00a		P-8	12.75	166	15.8	10.3
8/27/84	8:00a		P-9	16.38	213	14.8	10.2
8/28/84	8:00a		P-10	16.25	212	14.2	10.2
8/29/84	8:00a		P-11	18.00	235	13.9	10.2
8/30/84	8:00a		P-12	13.00	169	13.3	10.4
8/31/84	8:00a		P-13	17.00	222	13.3	10.3
9/1/84	8:00a		P-14	10.00	130	12.8	10.4
9/2/84	8:00a		P-15	15.75	205	12.5	9.8
9/3/84	8:00a		P-16	13.50	176	12.2	9.8
9/4/84	7:30a		P-17	15.00	195	11.8	9.9
9/5/84	7:00a		P-18	13.25	173	10.4	10
9/6/84	6:30a		P-19	17.50	228	11.5	9.8
9/7/84	6:30a		P-20	16.00	208	10.7	10.1
9/8/84	8:00a		P-21	15.00	195	9.3	10
9/9/84	8:00a		P-22	17.00	222	8.9	10
9/10/84	8:00a		P-23	20.00	261	8.9	10
9/11/84	8:00a		P-24	18.25	238	8.6	9.9
9/12/84	8:00a		P-25	19.50	254	8.6	9.9
9/13/84	8:00a		P-26	18.50	241	8.2	10
9/14/84	8:00a		P-27	15.00	195	8.5	10
9/15/84	8:00a		P-28	11.00	143	8.2	10
9/19/84	8:00a		P-29	8.00	104	7.6	10.2
9/19/84	FINAL BARREN SOLUTION			35.75	466	7.5	

#4

$$\text{CYANIDE CONSUMED} = \frac{(30 \text{ lbs} - (466 * 2.2 * 7.5/2000))}{(21130/2000)} = 2.5 \text{ lbs/ton}$$

Project Number P 1045
Lacana Gold Inc
Giltedge
Test #
Mine Run
Weight = 21130lbs.

Date	Sample	Liters	Oz Au/Ton	Oz Au	Cum Oz Au	Cum Oz Au/Ton	Au Dist
8/19/84	P-1	326	.286	.1027	.1027	.0097	
8/20/84	P-2	182	.203	.0407	.1434	.0136	
8/21/84	P-3	182	.129	.0259	.1692	.0160	
8/22/84	P-4	235	.052	.0135	.1827	.0173	
8/23/84	P-5	182	.042	.0084	.1911	.0181	
8/24/84	P-6	235	.02	.0052	.1963	.0186	
8/25/84	P-7	261	.012	.0034	.1997	.0189	
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9/4/84	P-17	195	.013	.0028	.2528	.0239	
9/5/84	P-18	173	.012	.0023	.2551	.0241	
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9/8/84	P-21	195	.008	.0017	.2643	.0250	
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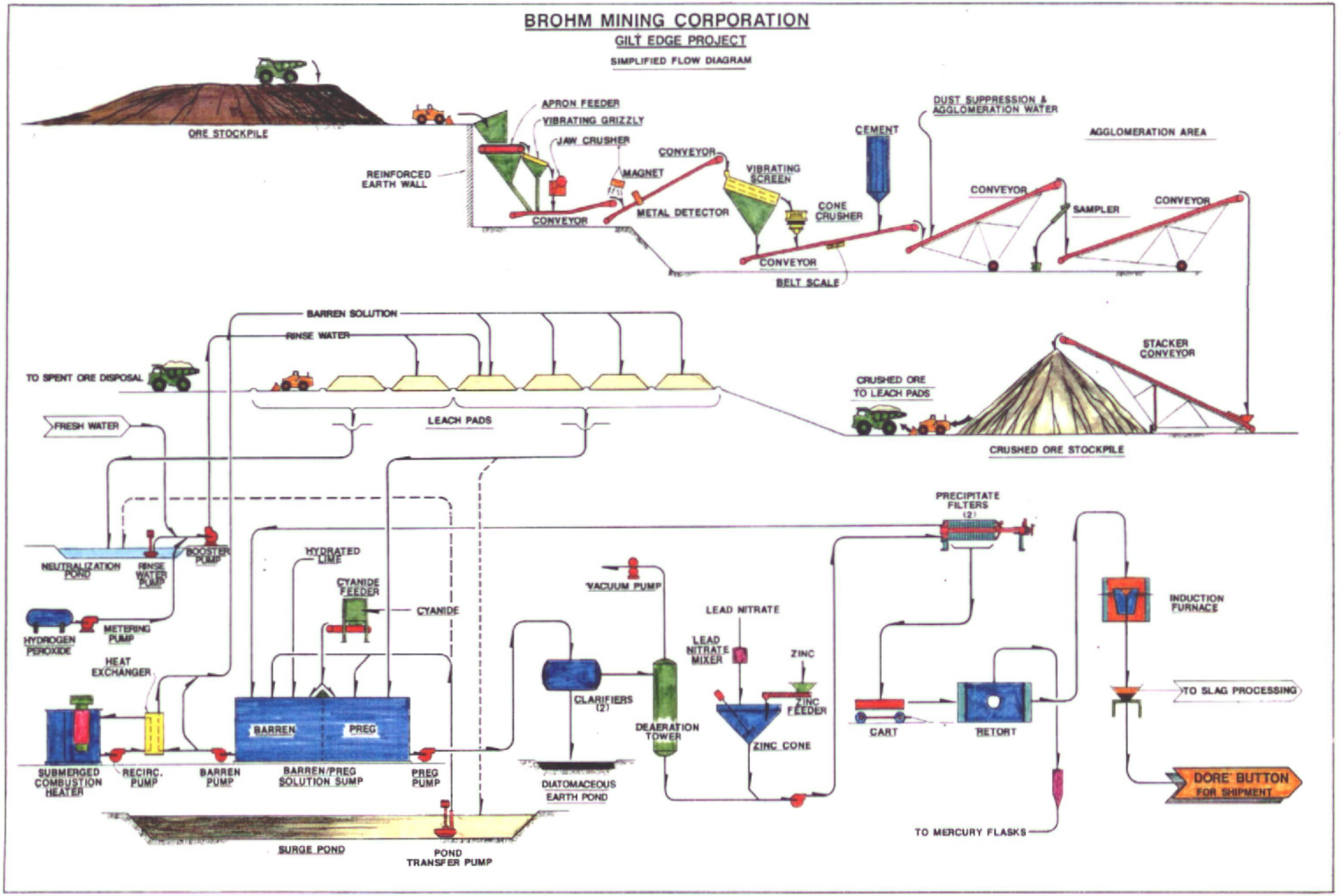
9/10/84	P-23	261	.005	.0014	.2670	.0253	
9/11/84	P-24	238	.003	.0008	.2677	.0253	
9/12/84	P-25	254	.001	.0003	.2680	.0254	
9/13/84	P-26	241	.004	.0011	.2691	.0255	
9/14/84	P-27	195	.003	.0006	.2697	.0255	
9/15/84	P-28	143	.001	.0002	.2699	.0255	
9/19/84	P-29	104	.003	.0003	.2702	.0256	

BROHM MINING CORPORATION

GILT EDGE PROJECT

SIMPLIFIED FLOW DIAGRAM



APRIL 7, 1987

TO: BROHM RESOURCES INC. - VANCOUVER, B.C.

FOR: FILES - SEE DISTRIBUTION.

FROM: REX L. OUTZEN.

SUBJECT: GILT EDGE PROJECT - METALLURGICAL TEST PROGRAM.

GENERAL:

The following report was prepared in order to consolidate and document recent metallurgical testwork conducted on Gilt Edge ores by Bill Whiteside, Scott Wanstedt and Bernie Stannus of Brohm Mining Corp. The following testwork was initiated in October, 1986. The program was designed to test the leachability of the ore at various feed sizes and to determine the optimum heap leach feed size. Along with the above, the testwork would provide results which would identify overall gold recovery, recovery rates and reagent requirements at the various feed sizes in order to provide information for plant design criteria.

SAMPLE LOCATION:

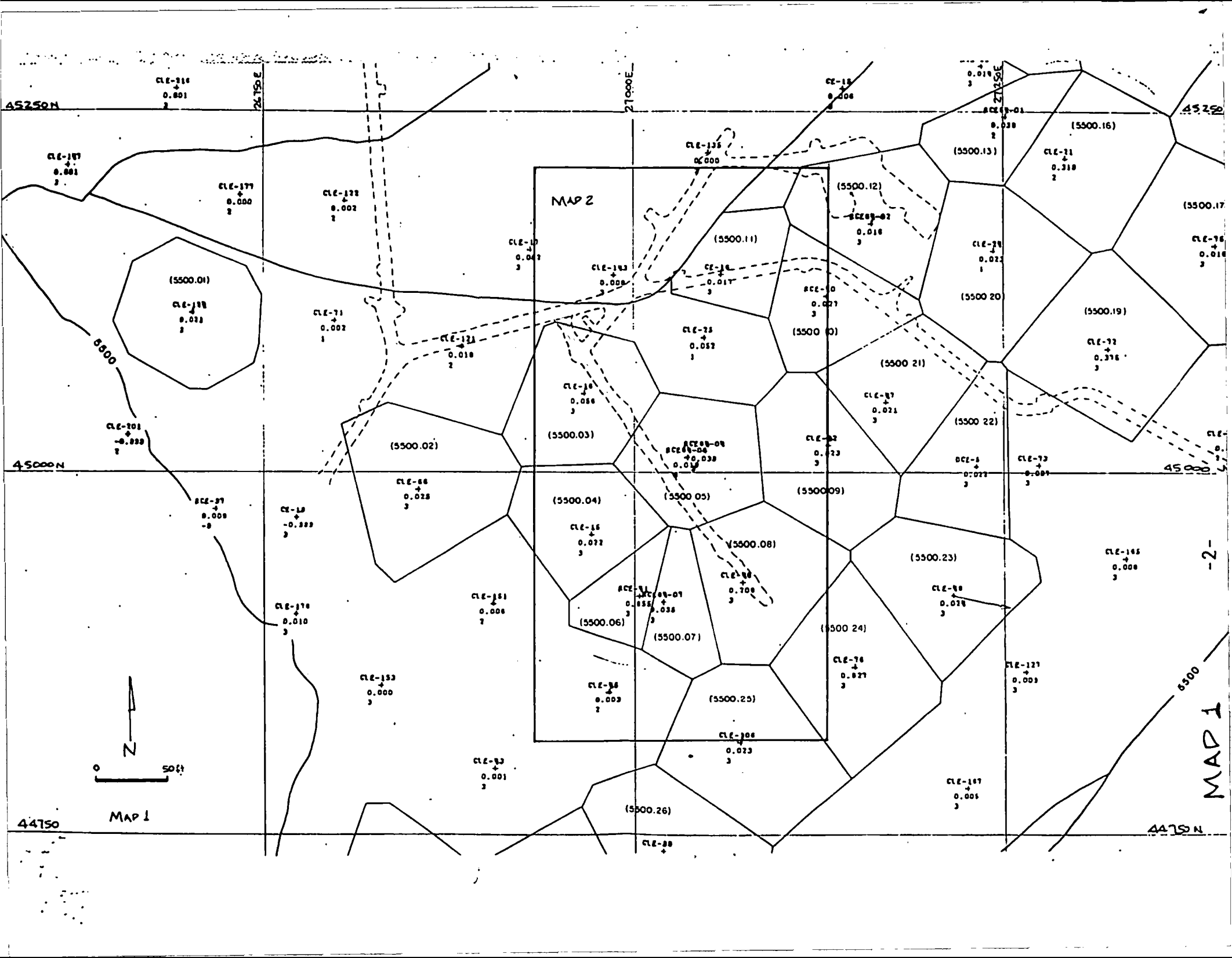
Ore samples used in the test program were from the underground Rattlesnake Adit, more commonly known as the Gilt Edge Crosscut, which was excavated by Lacana Gold Inc. in 1984. Samples were then taken from muck piles of material taken from three different rounds which were blasted, removed and sampled during Lacana's excavation. The muck piles and their average gold assays were Muck #1 (.040), Muck #6 (.034) and Muck #39 (.032). The target grade for the bulk sample was .035 oz/ton. Approximately 8 tons of rock was removed from these muck piles.

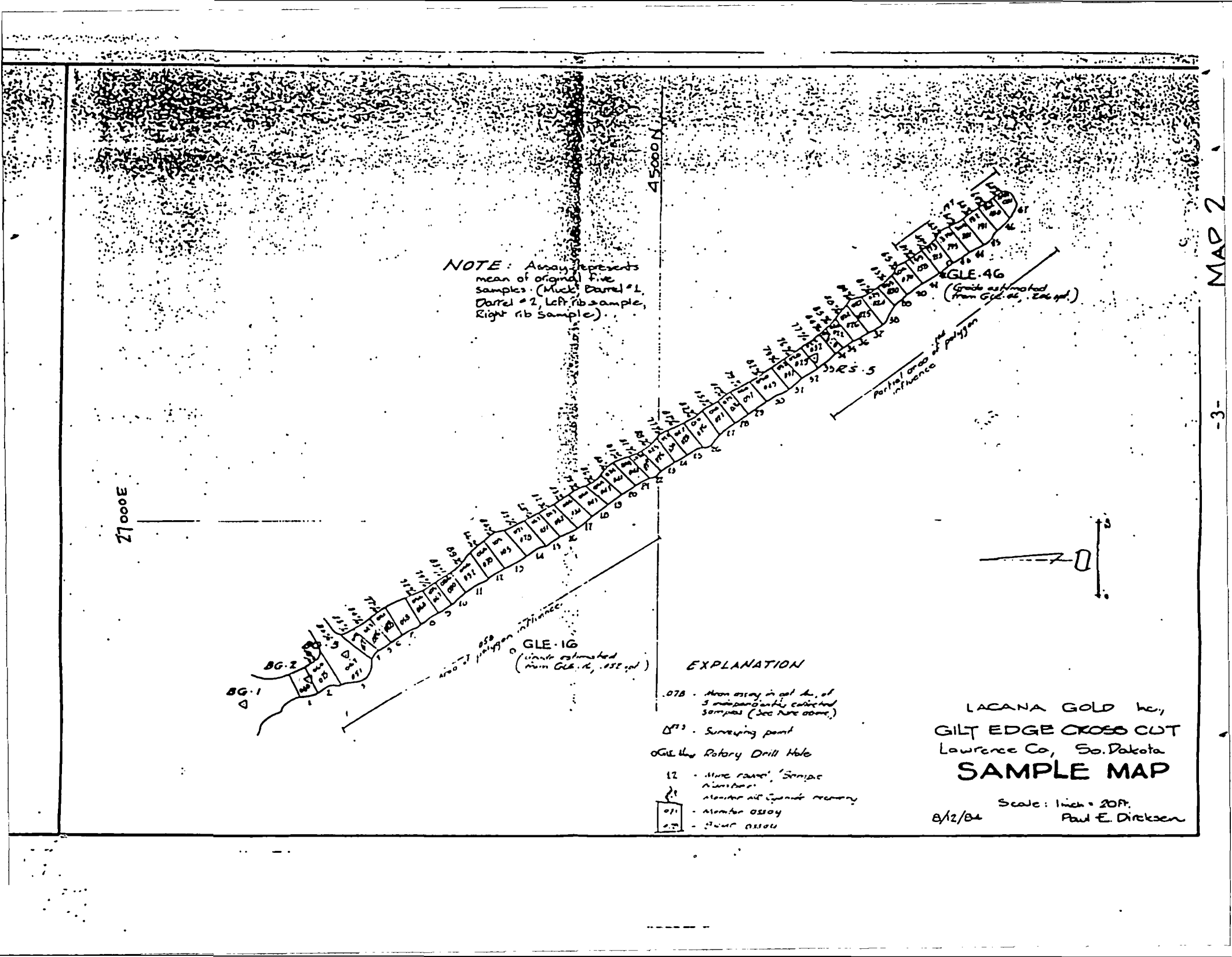
The location of the Gilt Edge Crosscut is shown in Map 1, part of the 5500 Level Plan. Map 2 shows the location of Muck samples 1, 6, and 39 within the Gilt Edge Crosscut.

GENERAL DESCRIPTION:

Four columns (2 each, 2 feet in diameter by 12 feet high and 2 each, 1 foot in diameter by 12 feet high) were constructed and installed in a warehouse located a short distance from the mine site. One 2 foot column was used to test as received ore, the other 2 foot column was used to test minus 4 inch material while the two 1 foot columns were utilized to test minus 2 inch and minus 3/4 inch material respectively.

Ore samples were collected and transported to the warehouse. After thorough blending a sample of the as received material was split out and after splitting out a representative head sample was loaded along with 2.0 pounds CaO per ton of ore into one of the two foot columns (Column #1). Rejects from the as received material was then reduced to minus 4 inch blended and a minus 4 inch sample was split out. After


MAP 2
(5500.01)
(5500.02)
(5500.03)
(5500.04)
(5500.05)
(5500.06)
(5500.07)
(5500.08)
(5500.09)
(5500.11)
(5500.12)
(5500.13)
(5500.16)
(5500.17)
(5500.19)
(5500 20)
(5500 21)
(5500 22)
(5500 23)
(5500 24)
(5500.25)
(5500.26)
45250N
45000N
44750
44750N
26750E
27000E
27250E
8500
N
0
50ft
MAP 1
-2-


NOTE: Assay represents mean of original five samples. (Muck, Barrel #1, Barrel #2, Left rib sample, Right rib sample).
45000N
27000E
GLE-46
(Grade estimated from GLE-46, 26ft opt.)
GLE-16
(Grade estimated from GLE-16, 45ft opt.)
BG-2
BG-1
Area of polygon influence
Partial area of polygon influence
EXPLANATION
.078 - Mean assay in opt. oz. of 5 independently collected samples (See Note above.)
Survey point
GLE-16 Rotary Drill Hole
12 - Mine round, sample number
Number of Grade recovery
071 - Number assay
.078 - Mean assay
LACANA GOLD Inc.,
GILT EDGE CROSS CUT
Lawrence Co, So. Dakota
SAMPLE MAP
Scale: 1 inch = 20ft.
8/12/84
Paul E. Dickson
MAP 2
-3-

obtaining a representative head sample the minus 4 inch material was loaded into the other two foot column (Column #2) along with 2.0 pounds CaO per ton of ore. The minus 4 inch rejects were reduced to minus 2 inch blended and a minus 2 inch sample was split out. A head sample was obtained and the minus 2 inch material along with 2.0 pounds CaO was loaded into a one foot column (Column #3). The minus 2 inch rejects were then reduced to minus 3/4 inch, blended sampled mixed with 2.0 pounds CaO and loaded into column #4. Head samples from all four columns were sent to Hazen Research for head screen analysis and determination of gold content and distribution.

COLUMN PERCOLATION LEACH TESTS:

Leaching of the four columns was initiated October 21, 1986, at a solution application rate of .005 gpm/ft^2. The barren solution contained 1.5 lbs. NaCN per ton and was kept at a pH of 10.5 to 11.0. Daily records were kept of the amount of NaCN added each day, to be compared with the cyanide returned in the pregnant solution, for a cyanide consumption estimate. A rough estimate of the amount of NaOH added was kept each day, but no estimate of the caustic or lime returned in the pregnant solution was made.

Pregnant solutions were measured and collected daily, and samples were titrated for CN content. The pH was measured and recorded. Samples were sent to two labs - Strawberry Hill Mining Company in Deadwood and Hazen Research in Denver - and gold assays were taken.

The columns were leached for a period of 75 days. They were then rinsed for 17 days with fresh water and then allowed to drain for 6 days. Solutions were collected, measured, titrated and assayed during this period also.

COLUMN LEACH TEST RESIDUE:

After the columns had been allowed to drain the residue from each column was removed and transported in its entirety to Hazen Research in Golden, Colorado. Residues were weighed wet and dry to obtain moisture content, thoroughly blended and half of the material from each column was screened and assayed to determine gold content and distribution. Figure I shows how the residue from each column was treated after being received by Hazen Research.

RESULTS:

A summary of the results from the testwork is included in this section and can be found in Table A. Table B shows gold extraction by size fraction for each column leach test. Recovery curves showing rates of gold extraction for each individual column can be found in the corresponding Graphs #1 through #4. (Graph #5 shows the leach time required to obtain 70% recovery at various feed sizes. Graph #6 shows recovery for various leach periods at various feed sizes.) Detailed data and results can be found in Appendix A.

Sample Preparation

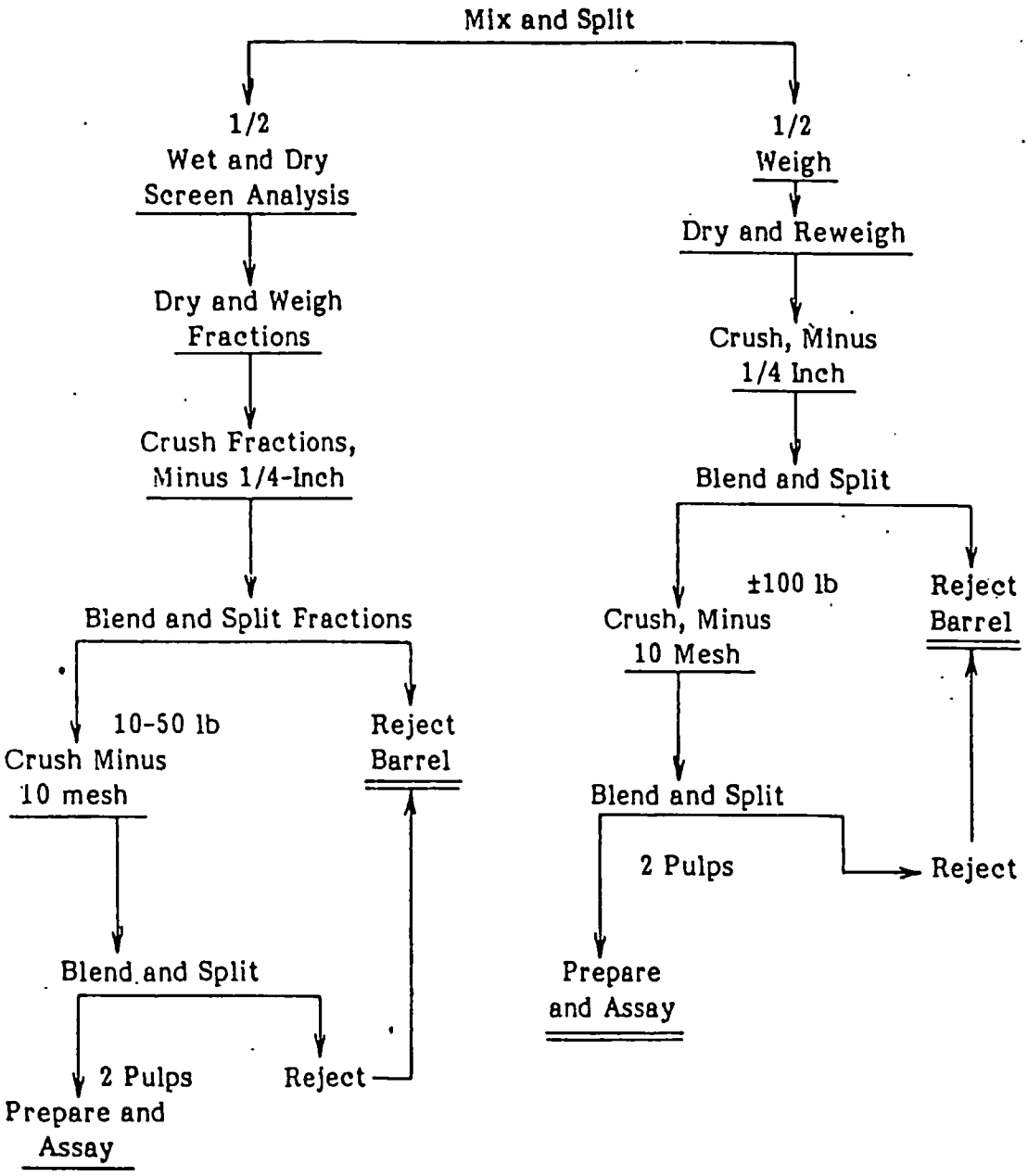


FIGURE 1

TABLE A

COLUMN LEACH TEST RESULT SUMMARY
GILT EDGE PROJECT

CUMULATIVE GOLD EXTRACTION (%)

TIME (Days)	Column #1 As Received	Column #2 - 4 inch	Column #3 - 2 inch	Column #4 -3/4 inch
1	-	-	-	-
5	1.69	-	-	-
10	7.37	2.15	0.35	7.43
15	15.73	8.78	15.12	34.48
20	22.24	14.67	28.19	46.03
25	26.85	28.59	39.22	54.98
30	33.27	38.47	50.47	65.45
35	39.18	42.69	58.08	69.85
40	43.70	46.74	62.66	72.21
45	47.31	49.40	66.20	73.78
50	53.05	52.26	69.44	75.26
55	56.71	55.62	71.68	75.75
60	58.90	57.61	73.29	76.56
65	60.95	61.65	75.81	77.18
70	61.86	63.45	77.16	77.18
75	63.15	65.66	78.12	77.18
80	64.41	67.88	78.67	77.18
85	66.30	70.27	79.11	77.18
90	68.38	71.50	79.11	77.18
95	69.16	72.47	79.14	77.18
99	69.16	73.01	79.14	77.18
Cum Au extracted oz/ton	.036	.038	.042	.045
Assay Head oz/ton	.041	.065	.050	.068
Calculated Head oz/ton	.051	.052	.052	.058
Au Recovery %	70.6	73.1	80.8	77.6
Cyanide Consumption lb/ton	.499	.432	.680	.060
Lime Added lbs	3.0	3.0	1.0	1.0
NaOH Added lbs	1.05	1.30	.52	.59

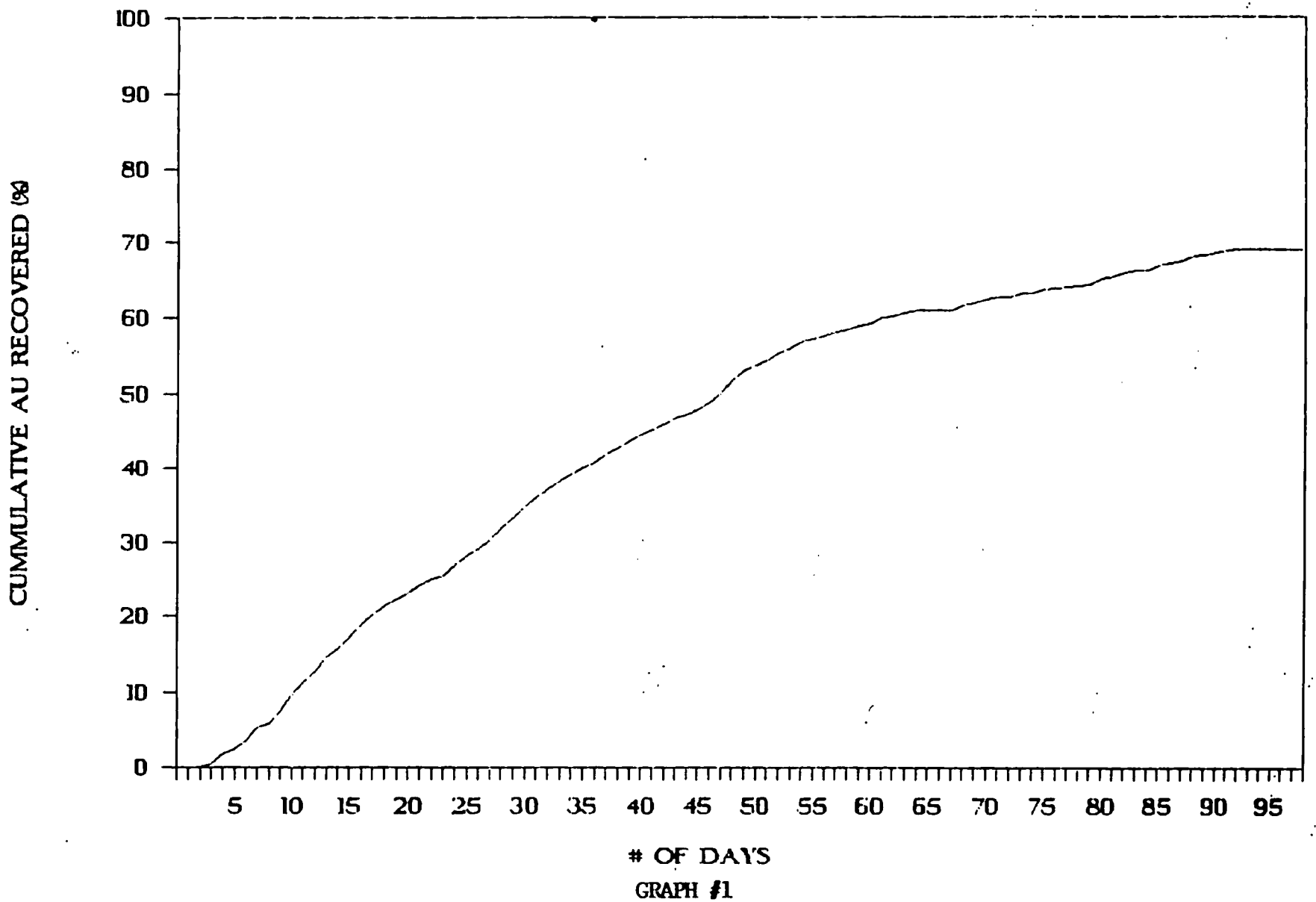
TABLE B

GILT EDGE PROJECT
COLUMN LEACH TESTS
RECOVERY BY SIZE FRACTION

SCREEN SIZE	ASSAY OZ/TON		%Au DIST		Au REC
	FEED	RESIDUE	FEED	RESIDUE	%
COLUMN #1 AS RECEIVED					
6" x 4"	.010	.012	5.4	3.4	NEG
4" x 2"	.012	.008	0.7	6.5	33.3
2" x 1"	.022	.009	7.7	8.2	59.1
1" x 3/4"	.060	.009	8.7	4.0	85.0
3/4" x 1/4"	.048	.012	26.5	14.2	75.0
- 1/4 "	.068	.019	51.0	64.7	71.2
TOTAL	.041	.014	100.0	100.0	65.9
COLUMN #2 - 4 INCH:					
4" x 2"	.028	.010	8.3	12.8	64.3
2" x 1"	.058	.009	7.4	25.1	84.5
1" x 3/4"	.042	.006	3.3	6.4	85.7
3/4" x 1/4"	.054	.007	20.8	11.4	87.0
- 1/4"	.092	.016	60.2	51.3	82.6
TOTAL	.065	.012	100.0	100.0	81.5
COLUMN #3 - 2 INCH:					
4" x 2"	.016	.011	2.8	5.8	31.3
2" x 1"	.036	.008	22.4	25.1	77.8
1" x 3/4"	.046	.008	7.3	6.4	82.6
3/4" x 1/4"	.036	.005	18.1	11.4	86.1
- 1/4"	.090	.011	49.4	51.3	87.8
TOTAL	.050	.009	100.0	100.0	82.0
COLUMN #4 - 3/4 INCH:					
1" x 3/4"	.022	.008	0.5	1.1	63.6
3/4" x 1/4"	.044	.009	27.1	26.1	79.5
- 1/4"	.096	.015	72.4	72.8	84.3
TOTAL	.068	.013	100.0	100.0	80.9

BROHM MINING CORP.

GILT EDGE LEACH TEST - COLUMN 1

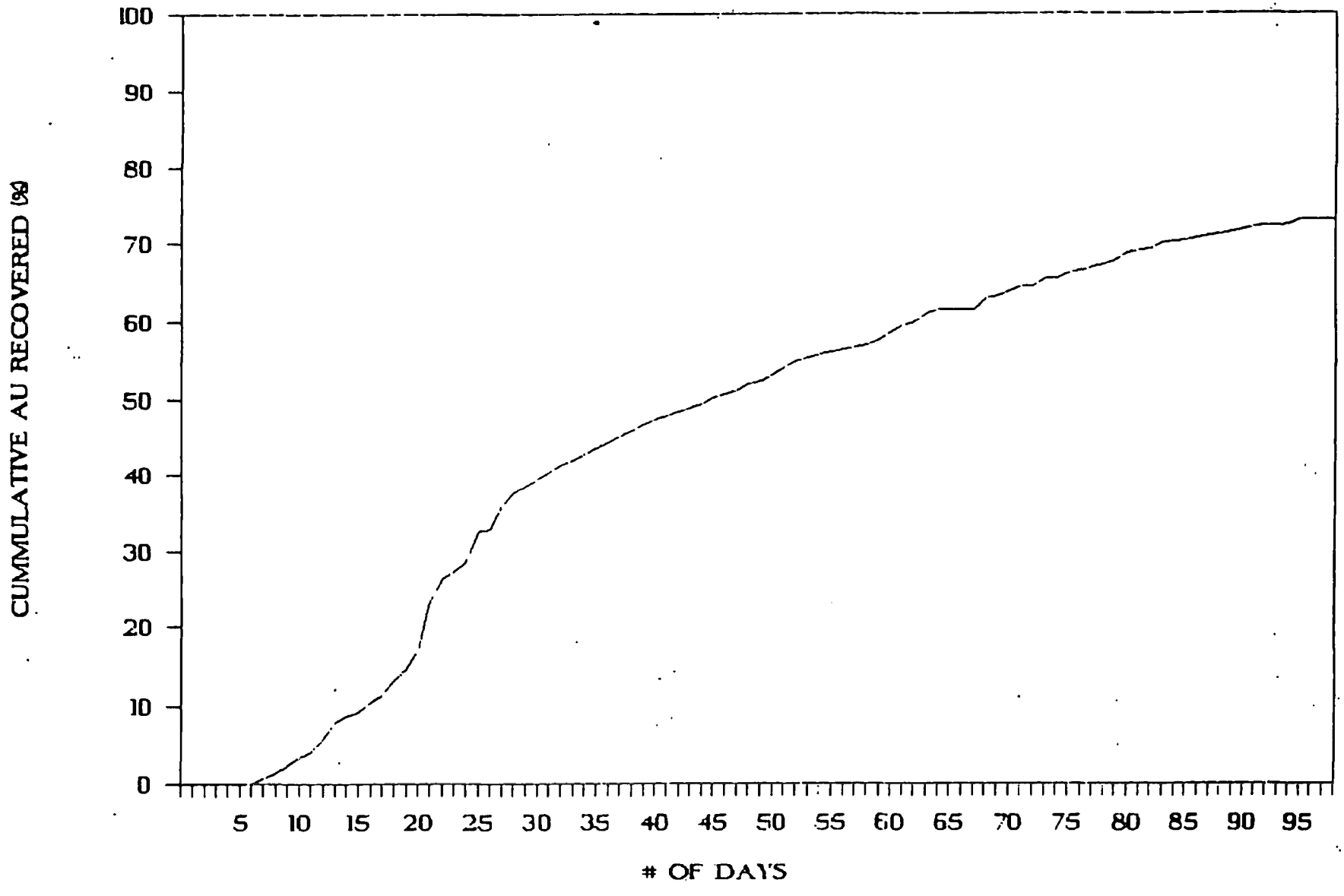


GRAPH #1

Mark 9/87

BROHM MINING CORP.

GILT EDGE LEACH TEST - COLUMN 2

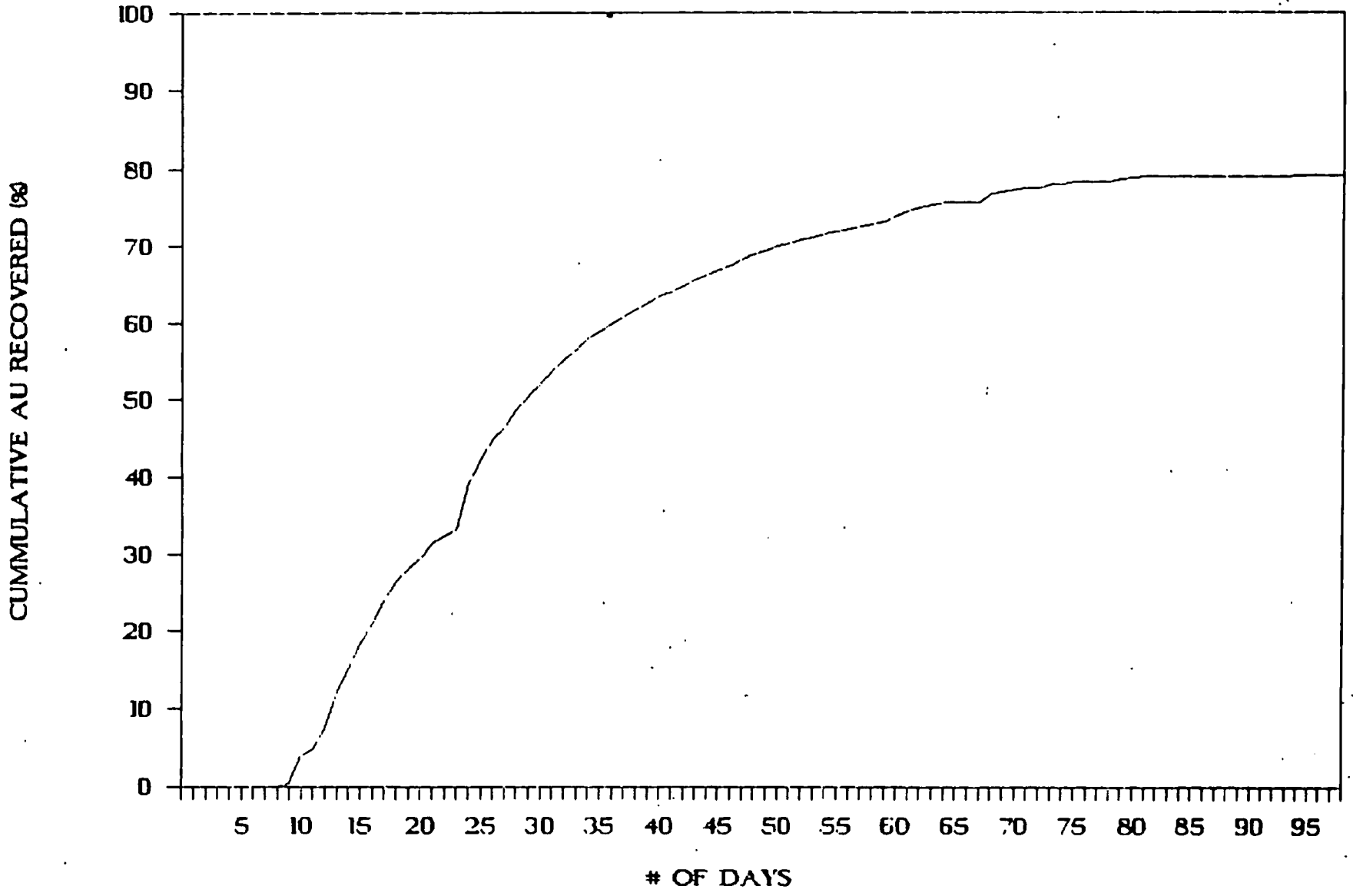


GRAPH #2

March 9/87

BROHM MINING CORP.

GILT EDGE LEACH TEST - COLUMN 3

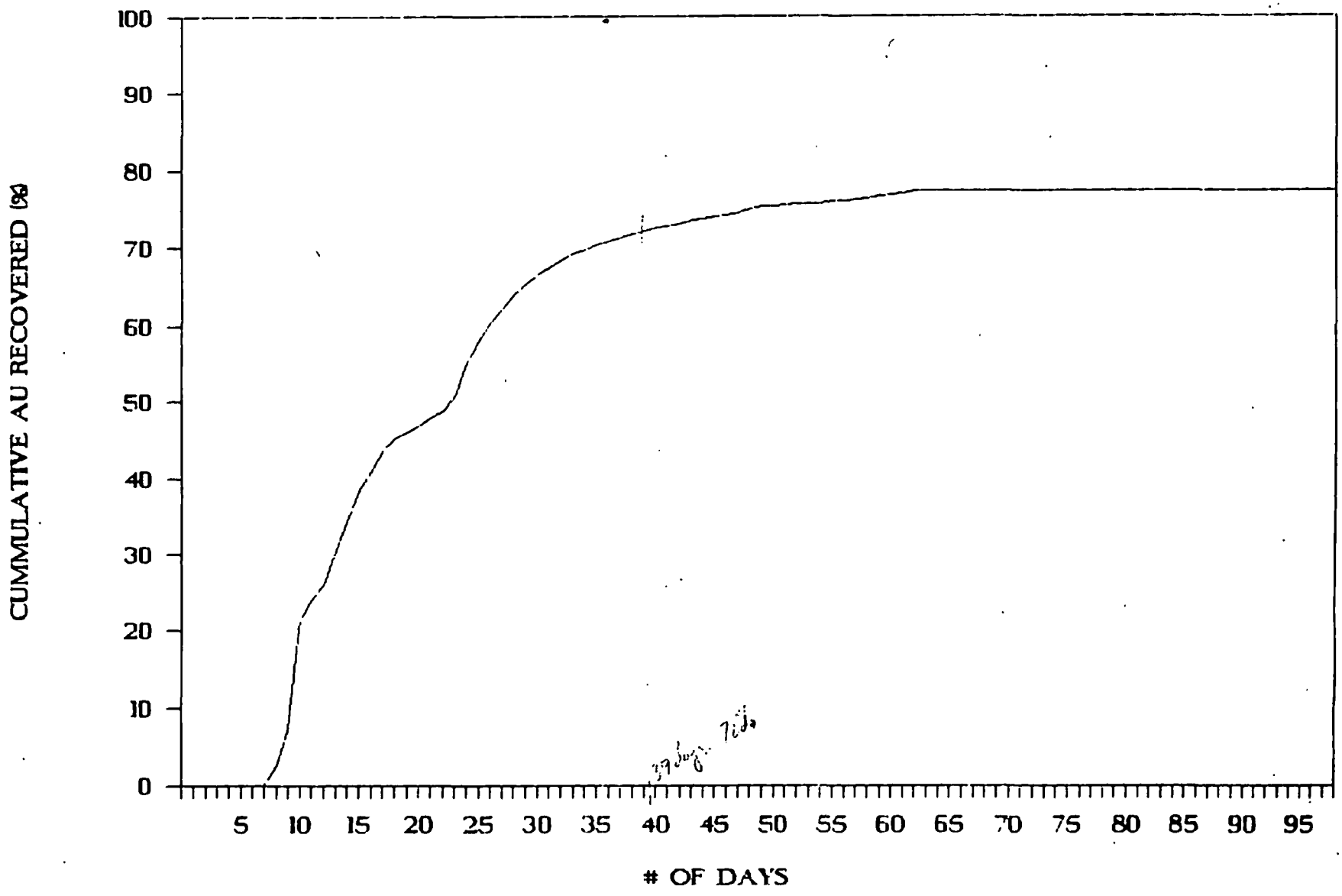


GRAPH #3

Mar 7/97

BROHM MINING CORP.

GILT EDGE LEACH TEST - COLUMN 4

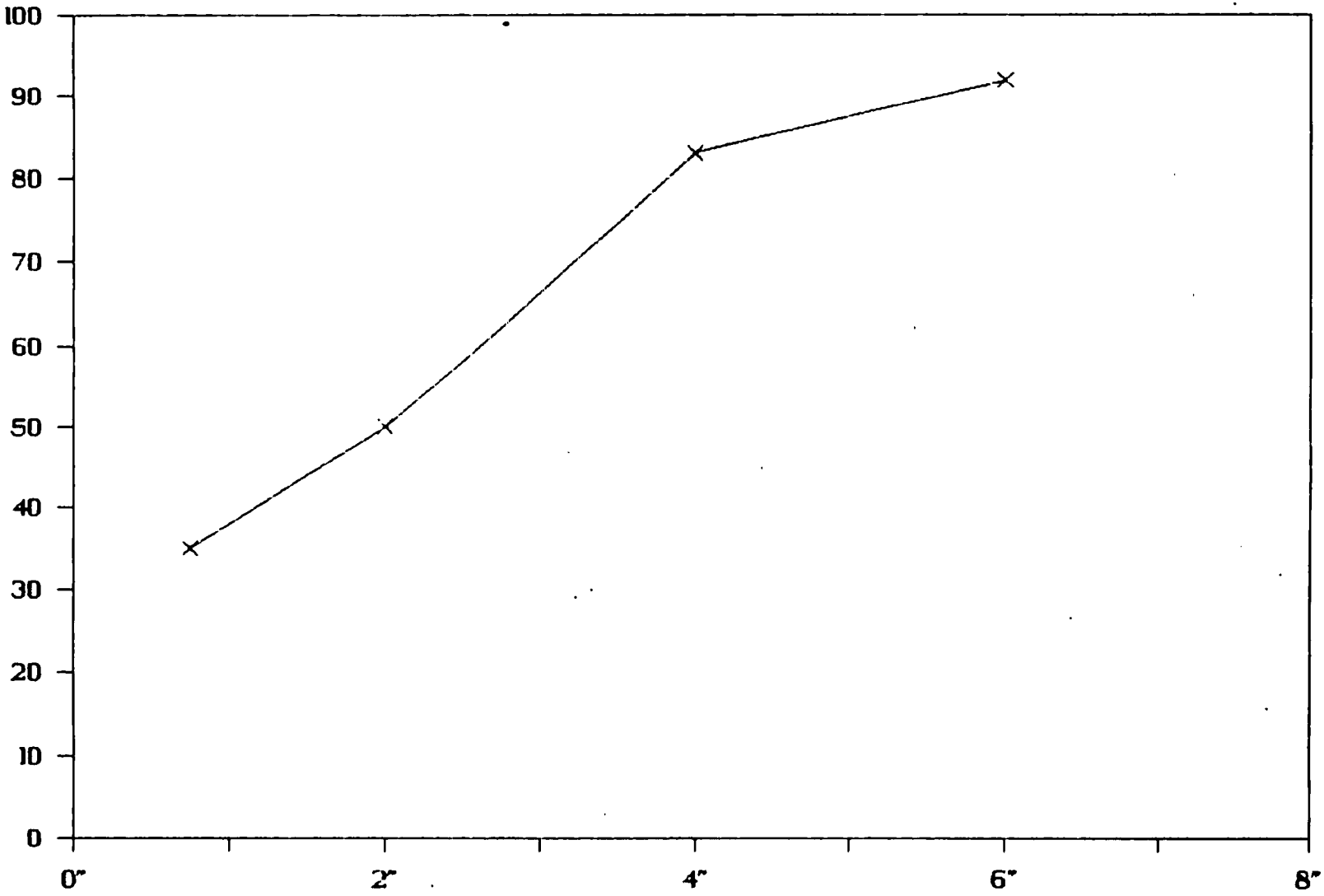


GRAPH #4

March 9/87

LEACH TIME REQUIRED

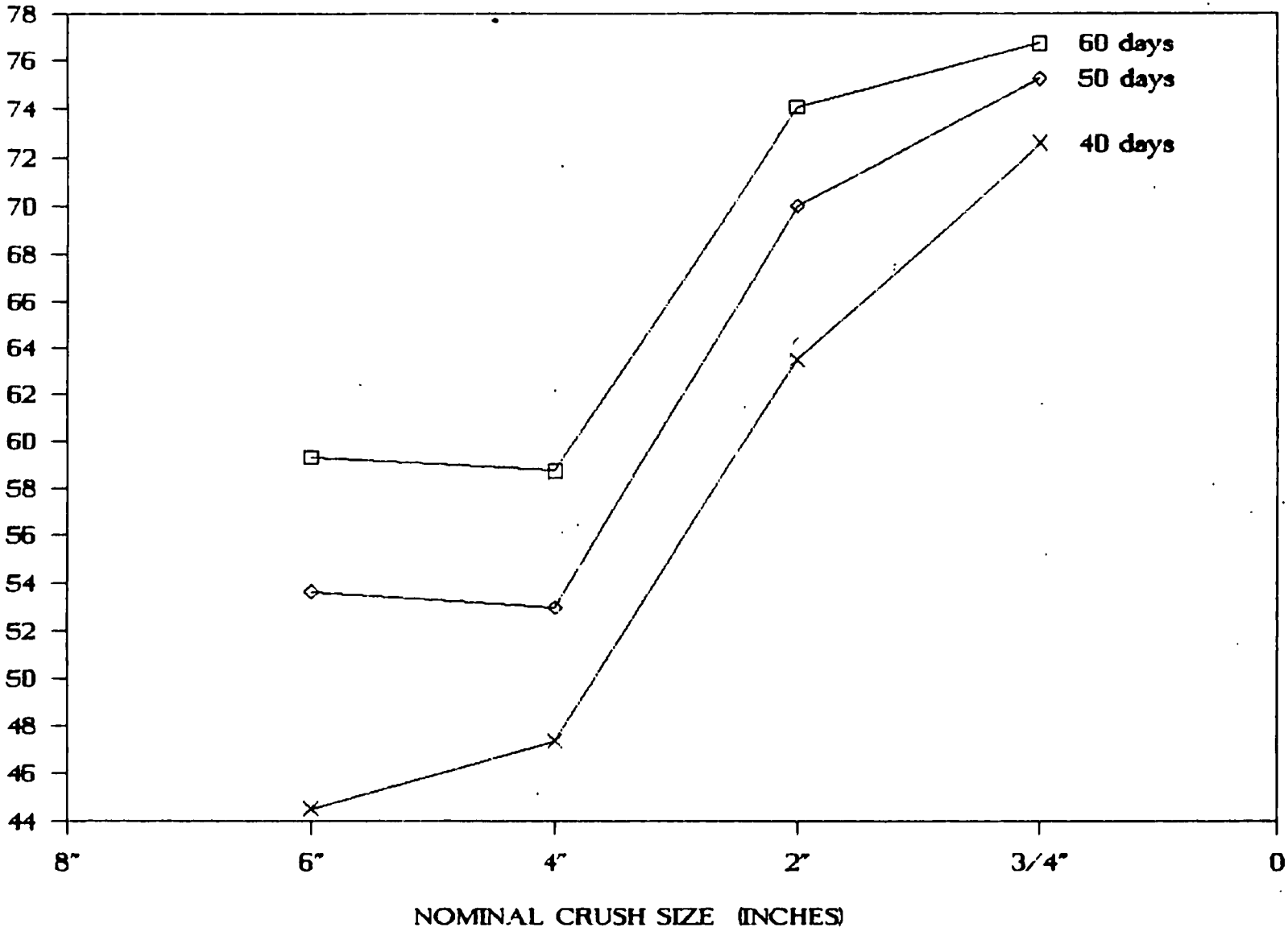
TO OBTAIN 70% AU RECOVERY



GRAPH #5

RECOVERY vs CRUSH SIZE

AT VARIOUS LEACH PERIODS



GRAPH #6

COMMENTS AND CONCLUSIONS:

In general, the recent testwork conformed closely to previous testwork in that the ore that was tested was amenable to heap leach cyanidation and overall gold extraction ranged from 70 to 80 percent. Cyanide consumption ranged from .50 lbs/ton to .68 lbs/ton if one ignores the .06 lbs/ton recorded in Column #4 which I assume to be in error. Insufficient data was collected to determine lime consumption although it did not appear to be excessive.

Overall, gold extraction in the four columns improved only slightly with decreasing feed size. However, the rate of gold extraction increased significantly with decreasing feed size which could significantly impact leach scheduling and overall project cash flow. The data shows that crushing the ore to 80% passing 2 inch would not significantly increase overall recovery but would significantly increase the rate of recovery.

Using the data presented in Table B (Recovery by size fractions) it appears that a substantial increase in recovery is realized in material smaller than 2 inches in size. However, this could be due to the low gold content in the coarser fractions and not due to reducing particle size. Also, the statement on Page 3 of February 26, 1987 Hazen Research report (insufficient feed material was taken to assure representativeness) leaves one to be somewhat suspect. Because the feed sample was not of sufficient size to be representative the corresponding size fraction gold analysis may be incorrect and the resulting gold recovery by size fraction may be suspect. Therefore, this data may not be useful in determining if fine crushing is warranted. One should also noted that if the feed screen analyses are correct the coarse fractions account for approximately 20% of the weight but only 7 to 8 percent of the total gold. In view of the fact that the Gilt Edge Project has limited leach pad area and leach pad construction will be extremely expensive one might select to screen out the coarse fractions and discard them. In doing so, some gold would be lost but the amount of material to be placed on the leach pad would be significantly reduced therefore, less leach pad area would be necessary. These types of economic trade offs should be evaluated. However, due to the quantity of feed screen analysis material the present data should not be used with great confidence to make these decisions. Because the present data is somewhat contradicting along with insufficient data being collected to determine reagent consumption and due to the questionable feed screen analysis sample, I would recommend that the testwork be performed once again under controlled conditions so that all the information gathered could be utilized with confidence.

REX L. OUTZEN.

RLO:lsh
cc - Wayne McClay.
- Barney Magnusson.
- Bernie Stannus.
- Rex Outzen.

APPENDIX "A"

HAZEN

Hazen Research (International), Inc.
4601 Indiana St. • Golden, Colorado 80403 • U.S.A.
Telephone (303) 279-4501 • Telex 45-860

February 26, 1987

Mr. Bernie Stannus
Brohm Resources
999 West Hastings
Suite 1580
Vancouver, B.C. V6C 2W6
Canada

Re: HRII Project 6513-01X
Sample Preparation and Analysis

Dear Mr. Stannus:

The following is to confirm the conditions and results of our work completed under subject project, and as transmitted to you informally by Federal Express on February 20. You will recall that the objective of our work was merely to treat and assay solutions and residues generated by your people at the Gilt Edge property.

Samples

Hazen received on February 3, 1987, ten 55-gallon barrels and four 5-gallon buckets containing:

1. One hundred and twenty-four (124) solution, effluent, samples covering the period December 19, 1986, through January 27, 1987.
2. Four (4) individual column leach residues.

Both solutions and solids were from Brohm's Gilt Edge property, Deadwood, South Dakota.

Procedures

The solutions were filtered and assayed for gold using our standard extraction/AA procedure.

Sample Preparation

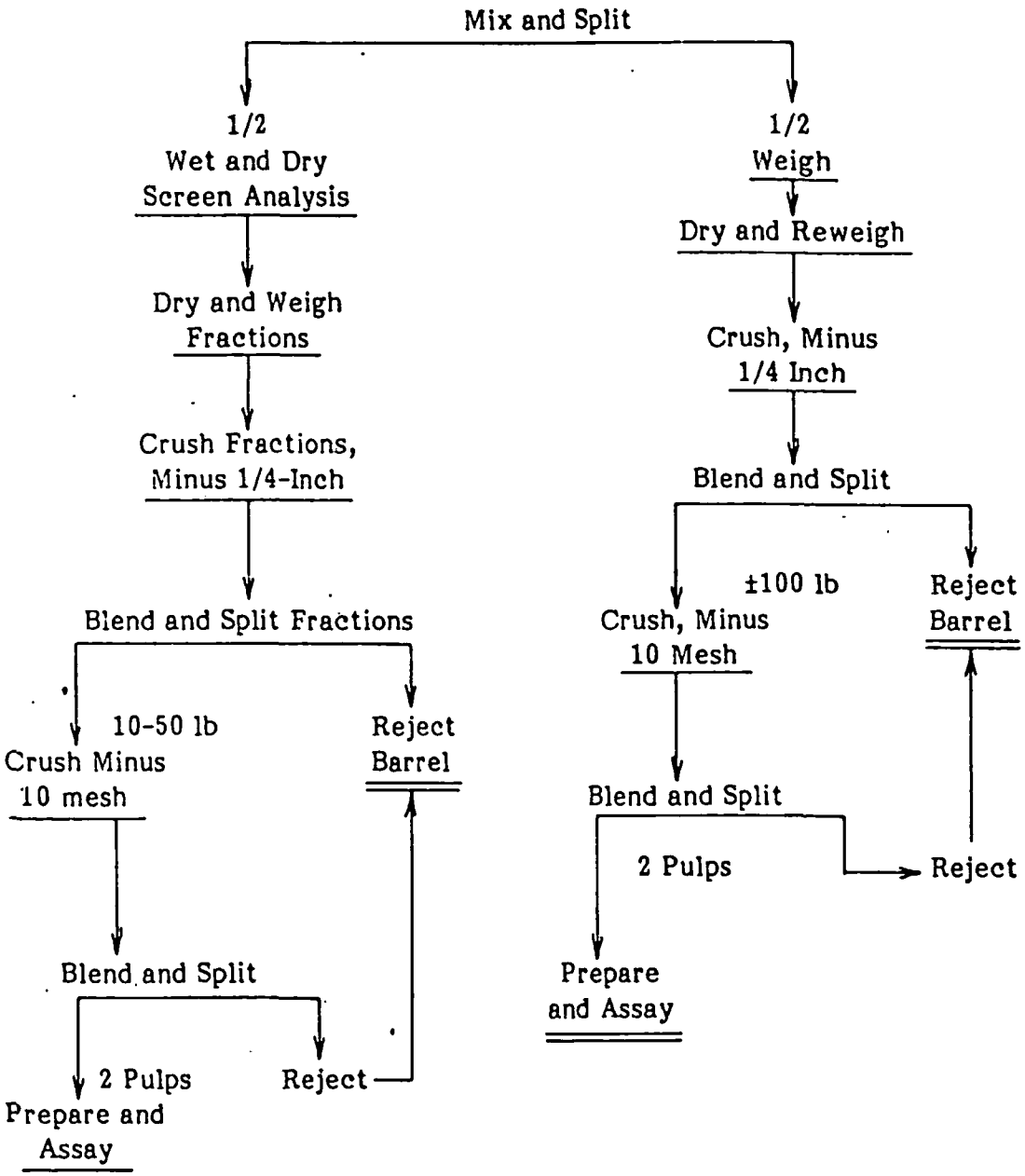


FIGURE 1

The four column residues were treated as generally shown in Figure 1. Therefore, one half of each residue was prepared in total; whereas, the second half was screened in total into the various size fractions. Two assay pulps each were prepared from the total 1/2 split and from various size fractions. All pulps were assayed, and averaged values are reported hereafter.

Results

Effluent assays for gold only are given in Table 1. The assays appear to be a logical continuation of those given earlier [1/], except that the last three, Samples 122-124, showed dramatic increases in gold content. No explanation for the increases is presently known.

Size/assay data for the four column residues and raw ore feeds are given in Table 2. The feed information was given previously in our Project 005-818 letter report dated November 24, 1986, but is repeated here for convenience.

The solids data add credence to the following conclusions:

1. The comparison of the weight distributions before and after leaching does not necessarily portray the effect of cyanide leaching upon ore decrepitation. As stated in previous correspondence, we believe that insufficient feed material was taken to assure representativeness,
2. Residual gold values based up calculations involving the screen data ("Calc") and direct analysis of the one-half split (1/2-Split) agree within reasonable limits.
3. It was the very coarsest and finest fractions which assayed highest in residual gold.
4. Based upon heads and tails assays solely, gold dissolutions were in the 60 to 80% range.

Total residue weight and residual gold data are as follows:

1/ Project 6513X letter dated January 9.

Table 1

Effluent Assays

Date	Column 1 HRI 34888	Column 1 Au, mg/l	Column 2 HRI 34888	Column 2 Au, mg/l	Column 3 HRI 34888	Column 3 Au, mg/l	Column 4 HRI 34888	Column 4 Au, mg/l
December								
19	1	0.22	2	0.25	3	0.12	4	0.06
20	5	0.30	6	0.38	7	0.16	8	0.07
21	9	0.30	10	0.37	11	0.16	12	0.06
22	13	0.22	14	0.30	15	0.14	16	0.06
23	17	0.26	18	0.25	19	0.11	20	0.05
24	21	0.39	22	0.46	23	0.10	24	
28	25	0.45	26	0.41	27	0.09	28	
29	29	0.36	30	0.34	31	0.06	32	
30	33	0.31	34	0.33	35	0.10	36	
31	37	0.22	38	0.26	39	0.09	40	
January								
2	41	0.17	42	0.36	43	0.06	44	0.05
4	45	0.19	46	0.46	47	0.08	48	
5	49	0.22	50	0.36	51	0.05	52	
6	53	0.13	54	0.26	55	0.05	56	
7	57	0.11	58	0.27	59	0.06	60	
8	61	0.20	62	0.20	63	0.07	64	
9	65	0.30	66	0.35	67	0.08	68	
10	69	0.24	70	0.54	71	0.07	72	
11	73	0.25	74	0.15	75	0.05	76	
12	77	0.26	78	0.25	79		80	
13	81	0.19	82	0.21	83		84	
14	85	0.20	86	0.10	87		88	
15	89	0.17	90	0.10	91		92	
16	93	0.24	94	0.10	95		96	
17	97	0.15	98	0.15	99		100	
18	101	0.17	102	0.10	103		104	
19	105	0.12	106	0.11	107		108	
20	109	0.12	110	0.14	111		112	
21	113	0.08	114	0.17	115		116	
23	117	0.15	118	0.18	119	0.06	120	
27	121	0.05	122	1.20	123	0.50	124	0.34

Table 2

Size/Assay Analysis

Size, inches	Residue, lb	Weight, % Feed	Weight, % Residue	oz/T Gold Feed	oz/T Gold Residue	oz/T Silver Feed	% Distribution Gold Feed	% Distribution Gold Residue
Column 1								
±6	-	-		-				
6 x 4	61	22.8	4.1	0.010	0.012	0.14	5.4	3.4
4 x 2	176	2.3	11.8	0.12	0.008	0.10	0.7	6.5
2 x 1	195	14.4	13.1	0.022	0.009	0.11	7.7	8.2
1 x 3/4	72	6.0	4.8	0.060	0.009	0.11	8.7	3.0
3/4 x 1/4	256	22.8	17.1	0.048	0.012	0.10	26.5	14.2
-1/4	733	31.9	49.1	0.068	0.019	0.11	51.0	64.7
Total	1493	100.0	100.0	-	-	-	100.0	100.0
Calc		-		0.041	0.014		-	-
1/2 split					0.017			
Column No. 2								
±6	-	-		-				
6 x 4	-	-		-				
4 x 2	232	19.4	15.5	0.028	0.010	0.12	8.3	12.8
2 x 1	202	8.3	13.5	0.058	0.009	0.10	7.4	10.0
1 x 3/4	73	5.1	4.9	0.042	0.006	0.10	3.3	2.4
3/4 x 1/4	250	24.9	16.8	0.054	0.007	0.14	20.8	9.7
-1/4	735	42.3	49.3	0.092	0.016	0.14	60.2	65.1
Total	1492	100.0	100.0	-	-	-	100.0	100.0
Calc		-		0.065	0.012			
1/2 split					0.016			
Column No. 3								
±6	-	-		-				
6 x 4	-	-		-				
4 x 2	19	8.7	4.6	0.016	0.011	0.09	2.8	5.8
2 x 1	114	31.0	27.5	0.036	0.008	0.09	22.4	25.1
1 x 3/4	29	7.9	7.0	0.046	0.008	0.09	7.3	6.4
3/4 x 1/4	83	25.1	20.0	0.036	0.005	0.08	18.1	11.4
-1/4	169	27.3	40.9	0.090	0.011	0.08	49.4	51.3
Total	414	100.0	100.0	-	-	-	100.0	100.0
Calc				0.050	0.009			
1/2 split				-	0.011			
Column No. 4								
±6	-	-						
6 x 4	-	-						
4 x 2	-	-						
2 x 1	-	-						
1 x 3/4	7	1.4	1.8	0.022	0.008	0.12	0.5	1.1
3/4 x 1/4	146	41.7	36.8	0.044	0.009	0.23	27.1	26.1
-1/4	244	56.9	61.4	0.096	0.015	0.11	72.4	72.8
Total	397	100.0	100.0	-	-	-	100.0	100.0
Calc				0.068	0.013			
1/2 split					0.014			

Column	% H_2O	Dry Weight, lb 1/2 Split	Dry Weight, lb Size Fractions	Dry Weight, lb Total	oz Au/ton Calc from Screen Analysis	oz Au/ton 1/2 Split
1	? 1/	1478	1493	2971	0.014	0.017
2	14.6	1491	1492	2983	0.012	0.016
3	29.8	351	414	765	0.009	0.011
4	33.3	320	397	717	0.013	0.014

1/ Not available, but probably is similar to No. 2 residue.

General

We have appreciated this opportunity to once again be of service to Brohm and hope for the chance of working with you again. If, for instance, you care to run additional columns, we can provide you here with 4", 6", 8", 10", 1', and 2' diameter units ready to go. I would enjoy showing you our facilities if you can arrange your busy schedule to stop by.

I will, shortly, be packaging up all the solution samples and rejects we have collected during Projects 005-818, 6351X, and 6351-01X, and will be shipping them to Deadwood. Please let me know when this is appropriate.

Very truly yours,

HAZEN RESEARCH, INC.

P. N. Thomas
Vice President

PNT:dmk

GILT EDGE LEACH TEST COLUMN 1 ROCK SIZE: RUN OF MINE* 1.4855 TONS
0.0512 oz/ton

CUMULATIVE CYANIDE RETURNED= SUM OF (INCHES x 0.00799 x PREG. CN lb/ton) mg/l x 0.029666 = oz per ton
CUMULATIVE Oz Au RECOVERED = SUM OF (INCHES x 0.00799 x Au Oz/ton)
CUMULATIVE % Au RECOVERED = CUML oz REC. / 0.076025 x 100%

				BARREN					PREGNANT										
DATE		TIME	DAY TEMP	GALS WATER	ADDED WATER	CN gr. ADDED	NaOH scoops	pH	INCHES	pH	CN lb/ton	CN RETURNED CUMULATIVE pounds	Au oz/ton S.MILL	Au mg/l HAZEN	Au oz/ton HAZEN	CUMUL. Oz Au RECOV S.MILL	CUMUL. % Au RECOVERED S.MILL	CUMUL. Oz Au RECOV HAZEN	CUMUL. % Au RECOVERED HAZEN
OCT.	21	12:00	34		30	0.0	0.5	11	0			0.00000			0.000	0.000	0.000	0.000	0.000
1986	22	.	44		0	0.0	0.0	11	0			0.00000			0.000	0.000	0.000	0.000	0.000
	23	9:30	43	14	15	87.3	4.0	11	1.625	9.5		0.00000	0.000	0.00	0.000	0.000	0.000	0.000	0.000
	24	9:30	38	25	0	0.0	0.0	12	1.5	10.5		0.00000	0.030	0.82	0.024	0.000	0.473	0.000	0.383
	25	11:00	46	12	10	26.3	2.0	12	2.75	10.2	1.2	0.02637	0.020	1.52	0.045	0.001	1.051	0.001	1.687
	26	10:45	48	19	0	0.0	0.0	12	1.375	10.4	0.775	0.03488	0.050	1.49	0.044	0.001	1.774	0.002	2.325
	27	10:15	44	15	0	0.0	0.0	11.7	1.5	10	0.775	0.04417	0.149	2.29	0.068	0.003	4.122	0.003	3.396
	28	2:20	50	0	25	71.0	7.5	12.5	3	10.2	0.85	0.06454	0.055	1.94	0.058	0.004	5.857	0.004	5.211
	29	9:00	35	22	0	0.0	0.0	12.5	0.75	9.5	0.45	0.06724	0.060	2.04	0.061	0.005	6.329	0.004	5.688
	30	8:15	35	12	15	43.3	4.5	12.5	3.5	11.5	1.375	0.10569	0.046	1.54	0.046	0.006	8.022	0.006	7.369
	31	10:45	44	15	5	14.5	1.5	12.5	5.5	11.7	0.925	0.14634	0.039	1.30	0.039	0.008	10.776	0.007	9.598
Nov.	1	12:00	44	9	10	28.9	3.0	12.5	4.625	11.2	0.925	0.18052	0.032	1.14	0.034	0.009	11.831	0.009	11.242
1986	2	11:15	46	9	10	28.3	3.0	12.5	4.125	11.4	1.05	0.21513	0.035	1.07	0.032	0.010	13.349	0.010	12.618
	3	11:15	39	8	20	53.7	6.0	12.2	5.25	11.5	1.05	0.25918	0.033	1.17	0.033	0.012	15.169	0.011	14.333
	4	10:30	44	25	0	0.0	0.0	12.4	1.875	10.3	0.85	0.27191	0.060	2.04	0.061	0.012	16.332	0.012	15.725
	5	11:00	48	15	5	10.3	1.5	12.4	3.625	11.4	1.2	0.30667	0.039	1.34	0.040	0.014	17.838	0.013	17.240
	6	9:30	46	12	20	49.8	6.0	12.4	3.75	11.6	1.25	0.34412	0.040	1.51	0.045	0.015	19.414	0.014	19.005
	7	10:45	35	27	0	0.0	0.0	12.4	2.5	11.4	1.178	0.36759	0.080	1.61	0.048	0.016	21.503	0.015	20.260
	8	3:00	34	21	0	0.0	0.0	12.4	2.75	11.3	1.25	0.39506	0.033	1.26	0.037	0.017	22.457	0.016	21.341
	9	3:00	26	15	10	28.7	3.0	12.3	1.75	10.6	1.125	0.41079	0.047	1.64	0.049	0.018	23.321	0.017	22.235
	10	8:45	14	12	20	54.9	6.0	12.3	3.5	11.5	0.925	0.43665	0.026	0.75	0.022	0.018	24.259	0.018	23.054
	11	11:00	26	13	20	57.1	6.0	12.5	7.125	11.8	1.4	0.51633	0.016	0.50	0.015	0.019	25.457	0.018	24.165
	12	11:15	25	24	0	0.0	0.0	12.4	3.875	11.7	1.575	0.56512	0.023	0.67	0.020	0.020	26.394	0.019	24.974
	13	10:45	26	16	15	42.6	4.5	12.5	2.375	11.6	1.55	0.59453	0.045	0.76	0.023	0.021	27.517	0.019	25.537
	14	10:30	39	21	15	42.9	4.5	12.4	5.125	10.8	1.3	0.64776	0.026	0.82	0.024	0.022	28.917	0.020	26.847
	15	11:15	37	26	0	0.0	0.0	12.4	5.25	11.6	1.35	0.70439	0.026	0.78	0.023	0.023	30.332	0.021	28.124
	16	1:30	41	18	0	0.0	0.0	12.4	4.25	11.6	1.4	0.75193	0.029	0.77	0.023	0.024	31.647	0.022	29.144
	17	9:30	32	11	20	54.6	6.0	12.5	3.5	11.6	1.375	0.79039	0.031	0.98	0.029	0.025	32.788	0.023	30.214
	18	11:30	32	20	15	39.7	4.5	12.4	5.5	11.6	1.375	0.85081	0.025	0.96	0.028	0.026	34.233	0.024	31.860
	19	10:15	36	26	10	28.9	3.0	12.4	4.75	11.7	1.45	0.90584	0.028	0.95	0.028	0.027	35.631	0.025	33.267
	20	9:45	35	28	0	0.0	0.0	12.4	4.375	11.6	1.425	0.95565	0.020	1.11	0.033	0.028	36.550	0.026	34.781
	21	11:30	47	20	15	42.1	4.5	12.4	4.25	11.7	1.425	1.00404	0.012	0.98	0.029	0.028	37.086	0.027	36.079
	22	10:30	37	25	0	0.0	0.0	12.4	4.625	11.6	1.45	1.05763	0.008	0.72	0.021	0.028	37.475	0.028	37.118
	23	11:40	38	11.5	15	42.5	4.5	12.2	6.125	11.7	1.4	1.12614	0.009	0.57	0.017	0.029	38.054	0.029	38.206
	24	1:00	53	13	20	54.4	6.0	12.3	6.625	11.8	1.35	1.19760	0.009	0.47	0.014	0.029	38.681	0.030	39.177
	25	11:30	42	21	15	43.0	4.5	12.3	5.75	11.7	1.4	1.26192	0.015	0.46	0.014	0.030	39.587	0.030	40.001
	26	11:30	42	22	15	41.4	4.5	12.4	6.5	11.7	1.475	1.33852	0.014	0.45	0.013	0.031	40.544	0.031	40.913
	27	10:30	38	28	0	0.0	0.0	12.4	4.375	11.6	1.375	1.38659	0.019	0.78	0.023	0.031	41.417	0.032	41.977
	28	12:00	41	19	15	40.0	4.5	12.4	4.25	11.8	1.525	1.43837	0.019	0.60	0.018	0.032	42.266	0.033	42.772
	29	1:30	39	25	0	0.0	0.0	12.4	4.25	11.8	1.625	1.49356	0.020	0.70	0.021	0.033	43.159	0.033	43.700
	30	12:15	32	18.5	15	37.4	4.5	12.4	4	11.7	1.575	1.54389	0.020	0.63	0.019	0.033	44.000	0.034	44.486
Dec.	1	9:50	27	24	10	26.7	3.0	12.4	4	11.7	1.475	1.59103	0.020	0.50	0.015	0.034	44.841	0.034	45.109
1986	2	10:30	32	22.5	10	29.1	3.0	12.4	5	11.8	1.45	1.64896	0.013	0.51	0.015	0.035	45.524	0.035	45.904

GILT EDGE LEACH TEST - COLUMN 1 - ROCK SIZE: RUN OF MINE - 1.4855 TONS
0.0512 oz/ton

CUMULATIVE CYANIDE RETURNED= SUM OF (INCHES x 0.00799 x PREG. CN lb/ton) mg/l x 0.029666 = oz per ton
CUMULATIVE Oz Au RECOVERED = SUM OF (INCHES x 0.00799 x Au Oz/ton)
CUMULATIVE % Au RECOVERED = CUM. oz REC. / 0.076025 x 100%

				BARREN				PREGNANT										
DATE	TIME	DAY TEMP	GALS WATER	ADDED WATER	CN gr. ADDED	NaOH scoops	pH	INCHES	pH	CN lb/ton	CN RETURNED CUMULATIVE pounds	Au oz/ton S.HILL	Au mg/l HAZEN	Au oz/ton HAZEN	CUMUL. Oz Au RECOV S.HILL	CUMUL. % Au RECOVERED S.HILL	CUMUL. Oz Au RECOV HAZEN	CUMUL. % Au RECOVERED HAZEN
3	11:45	32	21	10	29.0	3.0	12.4	5.625	11.7	1.5	1.71638	0.013	0.50	0.015	0.023	46.293	0.036	46.781
4	9:40	20	21	15	42.3	4.5	12.4	4.375	11.8	1.425	1.76619	0.014	0.39	0.012	0.036	46.936	0.036	47.313
5	9:40	30	26					4.875	11.8	1.4	1.82072	0.010	0.34	0.010	0.026	47.423	0.036	47.830
6	10:00	31	26	0	0.0	0.0	12.4	4.625	11.8	1.35	1.87061	0.015	0.66	0.020	0.037	48.152	0.037	48.782
7	10:10	32	16	20	57.2	6.0	12.4	5.125	11.8	1.425	1.92896	0.023	0.86	0.026	0.038	49.391	0.038	50.156
8	12:15	30	23	10	26.0	3.0	12.4	5.875	11.7	1.3	1.98998	0.023	0.87	0.026	0.039	50.811	0.039	51.749
9	10:30	20	21	15	39.9	4.5	12.4	5.625	11.7	1.4	2.05291	0.023	0.74	0.022	0.040	52.171	0.040	53.047
10	9:45	20	22.5	15	42.9	4.5	12.4	5.625	11.6	1.3	2.12032	0.012	0.35	0.010	0.040	52.880	0.041	53.661
11	9:35	30	27	10	29.0	3.0	12.4	4.875	11.8	1.375	2.17388	0.012	0.42	0.012	0.041	53.469	0.041	54.299
12	9:53	27	27	10	29.0	1.5	12	4.875	11.8	1.4	2.22841	0.013	0.56	0.017	0.041	54.110	0.042	55.151
13	10:45	34	25	5	14.4	0.3	12.1	5.375	11.8	1.45	2.29068	0.014	0.44	0.013	0.042	54.901	0.042	55.888
14	3:00	40	18	15	42.6	1.0	11.6	6.625	11.7	1.5	2.37008	0.013	0.40	0.012	0.042	55.806	0.043	56.714
15	11:30	38	23	10	27.8	0.7	11.5	4.875	11.5	1.5	2.42851	0.011	0.30	0.009	0.043	56.369	0.043	57.170
16	12:30	40	23	0	0.0	0.0	11.5	4.75	11.3	1.475	2.48449	0.009	0.29	0.009	0.043	56.819	0.044	57.600
17	10:00	28	16	15	41.7	0.3	11	3.625	10.9	1.475	2.52721	0.010	0.38	0.011	0.043	57.200	0.044	58.029
18	10:00	24	20	15	39.9	1.0	11	5	10.7	1.425	2.58414	0.009	0.30	0.009	0.044	57.673	0.044	58.497
19	12:30	32	22	10	29.2	0.7	11	5.875	10.6	1.475	2.65338	0.007	0.22	0.007	0.044	58.105	0.045	58.900
20	10:25	30	24	10	28.2	0.7	11	4.25	10.6	1.525	2.70516	0.009	0.3	0.009	0.044	58.485	0.045	59.297
21	3:00	34	19	15	42.2	1.0	11	6.875	10.6	1.475	2.78619	0.009	0.3	0.009	0.045	59.099	0.046	59.940
22	11:00	39	24	10	26.1	0.7	10.9	3.625	10.6	1.4	2.82674	0.009	0.22	0.007	0.045	59.423	0.046	60.189
23	10:45	38	22	10	28.7	0.7	10.9	5.5	10.6	1.425	2.88936	0.008	0.26	0.008	0.046	59.856	0.046	60.635
24	8:53	24	28	5	14.3	0.3	10.9	2.625	10.5	1.35	2.91767	0.015	0.39	0.012	0.046	60.270	0.046	60.954
25											2.91767			0.000	0.046	60.270	0.046	60.954
26											2.91767			0.000	0.046	60.270	0.046	60.954
27											2.91767			0.000	0.046	60.270	0.046	60.954
28	9:30	26	19	15	34.0	1.0	11.2	4.875	10.5	1.35	2.97026	0.009	0.45	0.013	0.046	60.731	0.047	61.638
29	11:40	40	20	15	43.2	1.0	10.8	2	10.4	1.45	2.99343	0.010	0.36	0.011	0.046	60.931	0.047	61.862
30	10:45	36	27	0	0.0	0.0	10.8	5	10.4	1.275	3.04436	0.008	0.31	0.009	0.047	61.351	0.047	62.346
31	11:00	34	8	25	71.8	1.7	10.8	4.875	10.4	1.225	3.09208	0.003	0.22	0.007	0.047	61.479	0.048	62.680
JAN. 1											3.09208			0.000	0.047	61.479	0.048	62.680
1987 2	1:30	38	18	0	0	0.0	10.8	8.875	10.4	1.25	3.18072	0.003	0.17	0.005	0.047	61.712	0.048	63.150
3											3.18072			0.000	0.047	61.712	0.048	63.150
4	12:00	43	8	25	71.5	1.7	10.8	8.125	10.3	1.35	3.26836	0.002	0.19	0.006	0.047	61.840	0.048	63.632
5	11:40	36	25	0	0	0.0	10.8	3.75	10.4	1.375	3.30956	0.007	0.22	0.007	0.047	62.116	0.049	63.889
6	12:30	38	16	0	0	0.0	10.8	4.125	10.4	1.45	3.35735	0.006	0.13	0.004	0.047	62.355	0.049	64.056
7	11:15	30	8	10	27.8	0.7	10.7	3.875	10.5	1.45	3.40224	0.003	0.11	0.003	0.048	62.487	0.049	64.189
8	10:30	24	8	5	14.2	0.3	10.8	3.5	10.4	1.475	3.44349	0.007	0.2	0.006	0.048	62.726	0.049	64.407
9	2:05	35	5	30				8.125	10.5	1.55	3.54411	0.008	0.3	0.009	0.048	63.384	0.050	65.167
10	10:20	30	16	15				4.375	10.4	0.8	3.57208	0.015	0.24	0.007	0.049	64.073	0.050	65.495
11	6:00	40	21	20				6.25	10.3	0.675	3.60579	0.008	0.25	0.007	0.049	64.566	0.050	65.932
12	11:10	49	15	5				2.5	10.2	0.475	3.61528	0.004	0.26	0.008	0.049	64.658	0.050	66.184
13	10:05	32	27	20				2	10.2	0.35	3.62087	0.006	0.19	0.006	0.049	64.774	0.050	66.303
14	10:25	32	17	15				8.75	10.3	0.275	3.64009	0.006	0.2	0.006	0.050	65.302	0.051	66.849

GILT EDGE LEACH TEST : COLUMN 1 · ROCK SIZE: RUN OF MINE. 1.4853 TONS
0.0512 oz/ton

CUMULATIVE CYANIDE RETURNED= SUM OF (INCHES x 0.00799 x PREG. CN lb/ton) mg/l x 0.029666 = oz per ton
CUMULATIVE Oz Au RECOVERED = SUM OF (INCHES x 0.00799 x Au Oz/ton) ·
CUMULATIVE % Au RECOVERED = CUM. oz REC. / 0.076025 x 100% ·

			BARREN					PREGNANT									
DATE	TIME	DAY TEMP	GALS WATER	ADDED WATER	CN gr. ADDED	NaOH scoops	pH	INCHES	pH	CN lb/ton	CN RETURNED CUMULATIVE pounds	Au oz/ton S.HILL	Au mg/l HAZEN	Au oz/ton HAZEN	CUMUL. Oz Au RECOV S.HILL	CUMUL. % Au RECOVERED S.HILL	CUMUL. Oz Au RECOV HAZEN	CUMUL. % Au RECOVERED HAZEN
15	10:30	20	20	25				7.5	10.2	0.175	3.65058	0.005	0.17	0.005	0.050	65.657	0.051	67.246
16	11:30	20	11	5				4.5	9.7	0.2	3.65777	0.003	0.24	0.007	0.050	65.799	0.051	67.583
17	10:35	20	26	15				11	9.7	0.15	3.67096	0.004	0.15	0.004	0.050	66.290	0.052	68.097
18	11:00	24	15	10				5.375	9.8	0.125	3.67632	0.004	0.17	0.005	0.051	66.516	0.052	68.382
19	12:15	30	15	5				6	9.8	0.125	3.68232	0.004	0.12	0.004	0.051	66.768	0.052	68.607
20	10:45	25	14					8.75	9.7	0.1	3.68931	0.004	0.12	0.004	0.051	67.159	0.052	68.934
21	11:30	24	8					3.875	9.7	0.1	3.69240	0.031	0.08	0.002	0.052	68.422	0.052	69.031
22											3.69240			0.000	0.052	68.422	0.052	69.031
23	4:00	32						2.75	9.5	0.1	3.69460	0.005	0.15	0.004	0.052	68.566	0.053	69.159
24											3.69460			0.000	0.052	68.566	0.053	69.159
25											3.69460			0.000	0.052	68.566	0.053	69.159
26											3.69460			0.000	0.052	68.566	0.053	69.159
27	2:00	42						1.875	9.5		3.69460	0.014	0	0.000	0.052	68.842	0.053	69.159
Totals, lbs					4.43637	1.05584					3.69460							
Totals, lbs/ton					2.98645	0.71076					2.48711							
Consumption, lbs/ton											0.49934							

SILT EDGE LEACH TEST COLUMN 2 ROCK SIZE: -4" 1.4915 TONS
0.0522 oz/ton

CUMULATIVE CYANIDE RETURNED= SUM OF (INCHES x 0.00799 x PREG. CN lb/ton) mg/l x 0.029166 = oz per ton
CUMULATIVE Oz Au RECOVERED = SUM OF (INCHES x 0.00799 x Au Oz/ton)
CUMULATIVE % Au RECOVERED = CUM. oz REC. / 0.077880 x 100%

				BARREN					PREGNANT											
DATE		TIME	DAY	GALS WATER	ADDED WATER	CN gr ADDED	NaOH scoops	pH	INCHES	pH	CN lb/ton	CN RETURNED CUMULATIVE pounds	Au oz/ton B.HILL	Au mg/l HAZEN	Au oz/ton HAZEN	CUMUL. Oz Au RECOVERED B.HILL	CUMUL. % Au RECOVERED B.HILL	CUMUL. Oz Au RECOV HAZEN	CUMUL. % Au RECOVERED HAZEN
OCT.	21	12:00	34	0	30	0.0	0.5	11	0	0	0	0.0000	0.000		0.000	0.000	0.000	0	0.000
1986	22	9:00	44	0	0	0.0	0.0	11	0	0	0	0.0000	0.000		0.000	0.000	0.000	0.000	0.000
	23	10:00	43	22	5	0.0	1.0	11	0	0	0	0.0000	0.000		0.000	0.000	0.000	0.000	0.000
	24	9:30	38	15	5	0.0	1.0	12	0.25	6.2	0	0.0000		0.00	0.000	0.000	0.000	0.000	0.000
	25	11:00	46	15	0	0.0	0.0	12	1.375	7	0	0.0000		0.00	0.000	0.000	0.000	0.000	0.000
	26	10:45	48	11	0	0.0	0.0	12	0.875	7.4	0	0.0000		0.00	0.000	0.000	0.000	0.000	0.000
	27	10:15	44	1	15	42.2	4.0	12	3.5	11	0	0.0000	0.034	0.00	0.000	0.001	1.221	0.000	0.000
	28	2:20	50	5	10	27.9	3.0	12.5	4.375	10.7	0.3	0.0105	0.013	0.42	0.012	0.001	1.804	0.000	0.559
	29	9:00	35	10	10	26.1	3.0	12.3	1.375	10.5	0.45	0.0154	0.034	1.32	0.039	0.002	2.284	0.001	1.112
	30	8:15	35	18	5	14.4	1.5	12.5	1.75	10	0.275	0.0193	0.060	1.94	0.058	0.003	3.361	0.002	2.145
	31	10:45	44	20	0	0.0	0.0	12.5	1.375	9.4	0.25	0.0220	0.072	2.67	0.079	0.003	4.377	0.003	3.262
NOV.	1	12:00	44	19	0	0.0	0.0	12.2	0.75	8.5	0.15	0.0229	0.077	2.63	0.078	0.004	4.969	0.003	3.863
1986	2	11:15	46	15	0	0.0	0.0	12.3	1.875	9.5	0.375	0.0285	0.090	3.27	0.097	0.005	6.701	0.004	5.729
	3	11:15	39	7	20	47.2	6.0	12.3	3.125	10.3	0.925	0.0516	0.075	2.38	0.071	0.007	9.105	0.006	7.992
	4	10:30	44	24	0	0.0	0.0	12.3	1	9.7	0.325	0.0558	0.081	2.58	0.077	0.008	9.926	0.007	8.778
	5	11:00	48	23	0	0.0	0.0	12.5	0.5	9.5	0.33	0.0572	0.086	2.83	0.084	0.008	10.377	0.007	9.208
	6	9:30	46	20	10	29.2	3.0	12.4	1.625	10.5	1.025	0.0705	0.065	2.56	0.076	0.009	11.461	0.008	10.474
	7	10:45	35	26	0	0.0	0.0	12.3	1.375	10.3	0.875	0.0801	0.065	2.40	0.071	0.010	12.379	0.009	11.479
	8	3:00	34	19	0	0.0	0.0	12.3	3	10.8	1.025	0.1047	0.060	1.93	0.057	0.011	14.209	0.010	13.241
	9	3:00	26	13	10	28.8	3.0	12.4	2.25	10.3	0.8	0.1191	0.066	2.09	0.062	0.012	15.721	0.011	14.672
	10	8:45	14	15	10	24.7	3.0	12.4	4.125	11.2	1.025	0.1529	0.058	1.82	0.054	0.014	18.153	0.013	16.957
	11	11:00	26	2	30	82.0	9.0	12.4	8.625	10.6	0.9	0.2149	0.068	2.40	0.071	0.019	24.172	0.018	23.257
	12	11:15	25	20	0	0.0	0.0	12.4	7.125	10.7	1.075	0.2761	0.047	1.44	0.043	0.022	27.607	0.021	26.380
	13	10:45	26	9	20	55.5	6.0	12.4	2.5	10.7	1.225	0.3006	0.060	1.31	0.039	0.023	29.146	0.021	27.377
	14	10:30	39	13	20	58.0	6.0	12.4	4	10.4	0.925	0.3301	0.035	1.00	0.030	0.024	30.583	0.022	28.594
	15	11:15	37	18	15	40.0	4.5	12.5	14.125	11.7	1.1	0.4543	0.027	0.92	0.027	0.027	34.495	0.025	32.349
	16	1:30	41	20	0	0.0	0.0	12.4	0.875	10.5	1.1	0.4620	0.029	0.95	0.028	0.027	34.756	0.026	32.902
	17	9:30	32	9	25	68.5	7.5	12.4	11.5	11.7	1.45	0.5952	0.031	0.87	0.026	0.030	38.413	0.028	35.847
	18	11:40	32	16	15	43.7	4.5	12.4	7.25	11.7	1.425	0.6778	0.020	0.79	0.023	0.031	39.901	0.029	37.590
	19	11:25	36	17	20	56.2	6.0	12.3	6.125	11.8	1.35	0.7438	0.021	0.47	0.014	0.032	41.220	0.030	38.467
	20	10:00	35	23	0	55.2	6.0	12.4	6.375	11.7	1.6	0.8253	0.014	0.43	0.013	0.033	42.136	0.031	39.301
	21	11:30	47	11	20	0.0	0.0	12.4	6.75	11.6	1.4	0.9008	0.029	0.50	0.015	0.034	44.144	0.031	40.328
	22	10:45	37	15.5	10	27.9	3.0	12.4	7.125	11.7	1.45	0.9834	0.017	0.42	0.012	0.035	45.387	0.032	41.239
	23	10:45	38	6	20	56.9	6.0	12.2	8.75	11.6	1.575	1.0935	0.006	0.30	0.009	0.036	45.925	0.033	42.038
	24	1:00	53	5	25	69.8	7.5	12.4	10.75	11.7	1.35	1.2094	0.005	0.20	0.006	0.036	46.477	0.033	42.692
	25	11:30	42	12	25	71.9	7.5	12.3	9	11.7	1.425	1.3119	0.007	0.31	0.009	0.037	47.123	0.034	43.541
	26	11:30	42	16	20	57.4	6.0	12.3	9.875	11.7	1.425	1.4243	0.006	0.24	0.007	0.037	47.731	0.034	44.263
	27	10:30	38	23	0	0.0	0.0	12.3	7.375	11.7	1.45	1.5098	0.014	0.38	0.011	0.038	48.790	0.035	45.116
	28	12:00	41	9	25	70.9	7.5	12.4	6.625	11.7	1.6	1.5945	0.015	0.42	0.012	0.039	49.810	0.036	45.962
	29	1:30	39	22	0	0.0	0.0	12.3	6.25	11.7	1.6	1.6744	0.017	0.41	0.012	0.040	50.868	0.036	46.742
	30	12:15	32	9	20	58.0	6.0	12.4	5.75	11.7	1.575	1.7467	0.014	0.35	0.010	0.040	51.694	0.037	47.355
DEC.	1	10:00	27	15	20	51.8	6.0	12.4	5.375	11.7	1.6	1.8155	0.012	0.30	0.009	0.041	52.336	0.037	47.846
1986	2	10:35	32	20	15	42.1	4.5	12.4	7	11.7	1.6	1.9049	0.008	0.23	0.007	0.041	52.894	0.038	48.336

03-Apr-87

GILT EDGE LEACH TEST COLUMN 2 ROCK SIZE: -4" 1.4915 TONS
0.0522 oz/ton

CUMULATIVE CYANIDE RETURNED= SUM OF (INCHES x 0.00799 x PREG. CN lb/ton) mg/l x 0.029666 = oz per ton
CUMULATIVE Oz Au RECOVERED = SUM OF (INCHES x 0.00799 x Au Oz/ton)
CUMULATIVE % Au RECOVERED = CUM. oz REC. / 0.077880 x 100%

				BARREN					PREGNANT										
DATE	TIME	DAY	GALS WATER	ADDED WATER	CN gr ADDED	NaOH scoops	pH	INCHES	pH	CN lb/ton	CN RETURNED CUMULATIVE pounds	Au oz/ton S.HILL	Au mg/l HAZEN	Au oz/ton HAZEN	CUMUL. Oz Au RECOVERED S.HILL	CUMUL. % Au RECOVERED S.HILL	CUMUL. Oz Au RECOV HAZEN	CUMUL. % Au RECOVERED HAZEN
3	11:45	32	17.5	15	42.7	4.5	12.4	9	11.6	1.6	2.0200		0.19	0.006	0.041	52.694	0.038	48.856
4	9:50	20	17	15	42.7	4.5	12.4	6.625	11.7	1.55	2.1020	0.009	0.27	0.008	0.042	53.506	0.038	49.401
5	9:50	30	13	15	42.8	4.5	12.54	6.625	11.8	1.5	2.1814	0.009	0.34	0.010	0.042	54.118	0.039	50.086
6	10:15	31	20	10	27.6	3.0	12.4	7	11.7	1.6	2.2709	0.006	0.25	0.007	0.042	54.548	0.039	50.619
7	10:15	32	13	20	58.1	6.0	12.4	8	11.8	1.575	2.3716	0.008	0.21	0.006	0.043	55.205	0.040	51.130
8	12:15	30	14	20	55.3	6.0	12.4	10	11.7	1.5	2.4915	0.008	0.22	0.007	0.044	56.026	0.040	51.800
9	10:30	20	17	20	55.0	6.0	12.4	8	11.8	1.5	2.5873	0.008	0.19	0.006	0.044	56.682	0.041	52.262
10	9:45	20	18	15	44.2	4.5	12.4	8	11.7	1.55	2.6864	0.009	0.30	0.009	0.045	57.380	0.041	52.993
11	9:40	30	18	15	39.6	4.5	12.4	10.5	11.8	1.375	2.8018	0.010	0.32	0.009	0.045	58.403	0.042	54.015
12	10:00	27	18	15	41.7	1	12	7.125	11.8	1.475	2.8857	0.016	0.32	0.009	0.046	59.573	0.043	54.709
13	10:50	34	17	15	42.7	1	12	7.375	11.8	1.55	2.9771	0.006	0.22	0.007	0.047	60.027	0.043	55.203
14	3:00	40	12	20	51	1.3	11.5	8.125	11.6	1.5	3.0745	0.015	0.17	0.005	0.048	61.277	0.043	55.623
15	11:30	38	17	20	56.8	1.3	11.4	6.75	11.4	1.5	3.1554	0.007	0.17	0.005	0.048	61.762	0.044	55.973
16	12:30	40	22	0	0	0.0	11.4	7.25	11.2	1.425	3.2379	0.006	0.18	0.005	0.048	62.171	0.044	56.370
17	10:00	28	11	20	57.8	1.3	11	6.125	10.9	1.4	3.3064	0.004	0.14	0.004	0.049	62.423	0.044	56.631
18	10:00	24	15	20	53.9	1.3	11	7.375	10.7	1.525	3.3963	0.005	0.16	0.005	0.049	62.763	0.044	56.990
19	12:30	32	16	15	37.5	1.0	11	8.125	10.7	1.525	3.4953		0.25	0.007	0.049	62.763	0.045	57.608
20	10:30	30	18	15	41.2	1.0	11	9.75	10.7	1.45	3.6082	0.009	0.38	0.011	0.050	63.663	0.046	58.736
21	3:00	34	11	20	55.5	1.3	11	7.5	10.6	1.475	3.6966	0.010	0.37	0.011	0.050	64.394	0.046	59.580
22	11:00	39	16	20	51.7	1.3	10.9	4.25	10.6	1.35	3.7425	0.006	0.30	0.009	0.050	64.656	0.047	59.969
23	10:50	38	19	15	42.8	1.0	11	14.75	10.7	1.325	3.8986	0.007	0.25	0.007	0.051	65.639	0.048	61.091
24	9:00	24	27	5	14.4	0.3	10.9	4	10.7	1.325	3.9410	0.006	0.46	0.014	0.051	65.886	0.048	61.651
25											3.9410			0.000	0.051	65.886	0.048	61.651
26											3.9410			0.000	0.051	65.886	0.048	61.651
27											3.9410			0.000	0.051	65.886	0.048	61.651
28	9:40	26	8	20	54.8	1.3	11.2	10.875	10.7	1.5	4.0713	0.011	0.41	0.012	0.052	67.113	0.049	63.008
29	11:40	40	19	15	39.7	1.0	10.8	4.25	10.5	1.375	4.1180	0.010	0.34	0.010	0.053	67.527	0.049	63.448
30	10:45	36	22	0	0	0.0	10.8	5.375	10.4	1.35	4.1760	0.009	0.33	0.010	0.053	68.023	0.050	63.988
31	11:00	34	3	30	79.6	2.0	10.7	9.25	10.4	1.225	4.2665	0.006	0.26	0.008	0.053	68.593	0.050	64.719
JAN. 1											4.2665			0.000	0.053	68.593	0.050	64.719
1987 2	1:30	38	17	0	0	0.0	10.8	8.625	10.5	1.3	4.3361	0.005	0.36	0.011	0.054	69.033	0.051	65.664
3											4.3361			0.014	0.054	69.033	0.051	65.664
4	12:00	43	7	25	71.5	1.7	10.7	5.125	10.4	1.3	4.4093	0.007	0.46	0.011	0.054	69.403	0.052	66.226
5	12:15	36	22	0	0	0.0	10.7	4.125	10.4	1.25	4.4505	0.007	0.36	0.008	0.054	69.678	0.052	66.552
6	12:30	38	12	10	28.7	0.7	10.7	5.75	10.4	1.1	4.5011	0.008	0.26	0.008	0.053	70.150	0.052	67.025
7	11:20	30	13	10	29	0.7	10.7	4.125	10.4	1.225	4.5414	0.007	0.27	0.006	0.053	70.447	0.052	67.276
8	10:50	24	11	5	14.3	0.3	10.8	5.625	10.4	1.45	4.6066	0.007	0.20	0.010	0.053	70.833	0.053	67.875
9	2:15	35	6	30	0		10.8	5.625	10.4	1.35	4.6673	0.002	0.35	0.016	0.053	70.934	0.054	68.800
10	10:30	30	16	15				1.875	10.3	1.275	4.6864	0.010	0.54	0.016	0.053	71.127	0.054	69.108
11	6:00	40	20	0				4.25	9.5	0.53	4.7051	0.005	0.15	0.004	0.056	71.323	0.054	69.302
12	11:20	49	13	20				9.5	10.3	0.525	4.7449	0.005	0.25	0.007	0.054	71.810	0.055	70.025
13	10:10	32	25	5				3.875	10.2	0.4	4.7573	0.006	0.21	0.006	0.056	72.059	0.055	70.272
14	10:35	32	14.5	20				6.625	10.1	0.225	4.7692	0.004	0.10	0.003	0.056	72.297	0.055	70.474

GILT EDGE LEACH TEST COLUMN 2 ROCK SIZE: -4" = 1.4915 TONS
0.0522 oz/ton

CUMULATIVE CYANIDE RETURNED= SUM OF (INCHES x 0.00799 x PREG. CN lb/ton) mg/l x 0.029866 = oz per ton
CUMULATIVE Oz Au RECOVERED = SUM OF (INCHES x 0.00799 x Au Oz/ton)
CUMULATIVE % Au RECOVERED = CUM. oz REC. / 0.077880 x 100%

			BARREN					PREGNANT										
DATE	TIME	DAY TEMP	GALS WATER	ADDED WATER	CN gr ADDED	NaOH scoops	pH	INCHES	pH	CN lb/ton	CN RETURNED CUMULATIVE pounds	Au oz/ton S.HILL	Au mg/l HAZEN	Au oz/ton HAZEN	CUMUL. Oz Au RECOVERED S.HILL	CUMUL. % Au RECOVERED S.HILL	CUMUL. Oz Au RECOV HAZEN	CUMUL. % Au RECOVERED HAZEN
15	10:35	20	16	15				10.75	10.1	0.15	4.7821	0.002	0.10	0.003	0.056	72.545	0.055	70.801
16	11:30	20	15	20				8.75	9.4	0.125	4.7908	0.006	0.10	0.003	0.057	73.083	0.055	71.068
17	10:50	20	23	5				4	9.6	0	4.7908	0.001	0.15	0.004	0.057	73.124	0.055	71.250
18	11:00	24	16	15				8.25	9.4	0	4.7908	0.003	0.10	0.003	0.057	73.378	0.056	71.501
19	12:15	30	10	15				10	9.6	0.15	4.8028	0.004	0.11	0.003	0.057	73.789	0.056	71.836
20	10:45	25	13	5				5.5	9.5	0.175	4.8105	0.004	0.14	0.004	0.058	74.028	0.056	72.070
21	11:30	24	5					4.625	9.5	0.175	4.8170	0.004	0.17	0.005	0.058	74.195	0.056	72.310
22											4.8170			0.000	0.058	74.195	0.056	72.310
23	4:00	32						2.875	9.4	0.15	4.8204	0.006	0.18	0.005	0.058	74.371	0.056	72.467
24								1.5			4.8204			0.036	0.058	74.371	0.057	73.015
25											4.8204			0.000	0.058	74.371	0.057	73.015
26											4.8204			0.000	0.058	74.371	0.057	73.015
27	2:00	42							9.5		4.8204	0.032	1.20	0.036	0.058	74.371	0.057	73.015
Totals, lbs					5.46304	1.30293					4.82042							
Totals, lbs/ton					3.66413	0.87357					3.23193							
Consumption, lbs/ton											0.43220							

GILT EDGE LEACH TEST COLUMN 3 ROCK SIZE -2" 0.3825 TONS
0.0518 oz/ton

CUMULATIVE CYANIDE RETURNED= SUM OF (INCHES x 0.00799 x PREG. CN lb/ton) mg/l x 0.02966 = oz per ton
CUMULATIVE Oz Au RECOVERED = SUM OF (INCHES x 0.00799 x Au Oz/ton)
CUMULATIVE % Au RECOVERED = CUM. oz REC. / 0.019825 x 100%

DATE	TIME	DAY	BARREN GALS WATER	BARREN ADDED WATER	BARREN CN gr ADDED	BARREN NaOH scoops	BARREN pH	PREGNANT INCHES	PREGNANT pH	PREGNANT CN lb/ton	CN RETURNED CUMULATIVE pounds	Au oz/ton S.HILL	Au mg/l HAZEN	Au oz/ton HAZEN	CUMUL. Oz Au RECOVERED S.HILL	CUMUL. % Au RECOVERED S.HILL	CUMUL. Oz Au RECOV HAZEN	CUMUL. % Au RECOVERED HAZEN
OCT. 21	12:00	34	0	30	0	0.5	11	0	0	0	0.00000			0.000	0.000	0.000	0	0.000
1986 22	9:00	44	0	0	0	0.0	11	0	0	0	0.00000			0.000	0.000	0.000	0.000	0.000
23	10:00	43	22	0	0	0.0	11	0	6	0	0.00000			0.000	0.000	0.000	0.000	0.000
24	9:30	38	18	0	0	0.0	12.5	0.625	6	0	0.00000		0.00	0.000	0.000	0.000	0.000	0.000
25	11:00	46	14	0	0	0.0	12.5	1.125	6	0	0.00000		0.00	0.000	0.000	0.000	0.000	0.000
26	10:45	48	10	0	0	0.0	12.5	0.625	6	0	0.00000	0.002	0.00	0.000	0.000	0.050	0.000	0.000
27	10:15	44	5	10	0	2.0	12.5	0.5	7.4	0	0.00000	0.008	0.00	0.000	0.000	0.212	0.000	0.000
28	2:20	50	10	5	39.3	1.5	12.5	0.875	10.5	0	0.00000	0.002	0.00	0.000	0.000	0.282	0.000	0.000
29	9:00	35	15	0	0	0.0	12.5	5.25	11	0.1	0.00419	0.001	0.00	0.000	0.000	0.494	0.000	0.000
30	8:15	35	13	10	28.7	3.0	12	0.875	10.5	0.35	0.00664	0.012	0.33	0.010	0.000	0.917	0.000	0.345
31	10:45	44	18	0	0	0.0	12.3	2.125	11.5	0.48	0.01479	0.041	1.43	0.042	0.001	4.428	0.001	3.978
NOV. 1	12:00	44	17	0	0	0.0	12	0.25	9.8	0.25	0.01529	0.074	2.23	0.066	0.001	5.174	0.001	4.644
1986 2	11:15	46	16	0	0	0.0	12	0.75	9.8	0.35	0.01739	0.090	3.31	0.098	0.002	7.894	0.002	7.612
3	11:15	39	12.5	10	28.8	3.0	12.2	1.375	10.6	1.025	0.02863	0.079	2.73	0.081	0.002	12.272	0.002	12.099
4	10:30	44	19	0	0	0.0	12.2	1.375	10.7	1.2	0.04183	0.058	1.84	0.055	0.003	15.486	0.003	15.123
5	11:00	48	15	0	0	0.0	12.3	2	11.4	1.075	0.05901	0.037	1.34	0.040	0.004	18.469	0.004	18.327
6	9:30	46	10	20	57.5	6.0	12.3	1.75	11.2	1.2	0.07579	0.025	1.25	0.037	0.004	20.232	0.004	20.942
7	10:45	35	24	0	0	0.0	12.3	2.75	11.5	1.175	0.10161	0.026	0.92	0.027	0.005	23.114	0.005	23.966
8	3:00	34	19	0	0	0.0	12.2	2.5	11.6	1.3	0.12758	0.023	0.81	0.024	0.005	25.381	0.005	26.386
9	3:00	26	16	0	0	0.0	12.2	1.625	10.7	1.425	0.14608	0.028	0.93	0.028	0.005	27.214	0.006	28.193
10	8:45	14	14	0	0	0.0	12.3	0.875	10.6	1.3	0.15517	0.036	1.22	0.036	0.006	28.484	0.006	29.469
11	11:00	26	7	25	68.4	7.5	12.5	2	10.8	1.5	0.17914	0.023	0.82	0.024	0.006	30.338	0.006	31.429
12	11:15	25	32	0	0	0.0	12.4	0.75	10.6	1.2	0.18833	0.037	1.05	0.031	0.006	31.456	0.006	32.371
13	10:45	26	32	0	0	0.0	12.4	0.375	9.8	0.3	0.18723	0.027	1.92	0.057	0.006	31.864	0.007	33.231
14	10:30	39	21	10	26.7	3.0	12.5	5.625	10.8	1.1	0.23666	0.025	0.89	0.026	0.007	37.532	0.008	39.216
15	11:15	37	25	0	0	0.0	12.4	2.875	11.5	1.225	0.26480	0.033	0.88	0.026	0.008	41.356	0.008	42.240
16	1:30	41	20	0	0	0.0	12.5	2.875	11.5	1.35	0.29581	0.023	0.74	0.022	0.009	44.021	0.009	44.783
17	9:30	32	14	20	57	6.0	12.4	2.5	11.6	1.5	0.32578	0.022	0.56	0.017	0.009	46.237	0.009	46.457
18	11:50	32	28	0	0	0.0	12.4	3	11.5	1.5	0.36173	0.019	0.61	0.018	0.010	48.534	0.010	48.644
19	11:35	36	22	10	26.7	3.0	12.4	3	11.6	1.425	0.39589	0.015	0.51	0.015	0.010	50.348	0.010	50.473
20	10:15	35	26	0	0	0.0	12.3	2.875	11.5	1.45	0.42920	0.013	0.46	0.014	0.010	51.854	0.010	52.054
21	11:30	47	20	15	42.4	4.5	12.4	3	11.6	1.5	0.46515	0.013	0.45	0.013	0.011	53.426	0.011	53.668
22	10:50	36	30	0	0	0.0	12.4	2.5	11.5	1.475	0.49462	0.009	0.44	0.013	0.011	54.333	0.011	54.983
23	11:50	38	21	5	14.2	1.5	12.2	4.125	11.5	1.475	0.54323	0.008	0.32	0.009	0.011	55.663	0.011	56.561
24	1:00	53	16	15	42.8	4.5	12.3	4.875	11.7	1.55	0.60360	0.002	0.26	0.008	0.011	56.056	0.012	58.076
25	11:30	42	26	0	0	0.0	12.3	2.625	11.2	1.45	0.63402	0.006	0.28	0.008	0.011	56.691	0.012	58.954
26	11:30	42	20	15	40.9	4.5	12.4	2.875	11.6	1.425	0.66675	0.007	0.28	0.008	0.011	57.444	0.012	59.917
27	10:30	38	31	0	0	0.0	12.4	2.25	11.5	1.475	0.69327	0.011	0.30	0.009	0.012	58.441	0.012	60.724
28	12:00	41	25	10	26.1	3.0	12.4	3	11.6	1.475	0.72862	0.011	0.29	0.009	0.012	59.771	0.012	61.764
29	1:30	39	28	0	0	0.0	12.4	3	11.7	1.5	0.76458	0.010	0.25	0.007	0.012	60.980	0.012	62.660
30	12:15	32	23	0	0	0.0	12.3	2.75	11.6	1.475	0.79699	0.010	0.26	0.008	0.012	62.089	0.013	63.515
DEC. 1	10:10	27	20.5	10	26.2	3.0	12.4	1	11.4	1.45	0.80957	0.015	0.34	0.010	0.012	62.693	0.013	63.921
1986 2	10:45	32	26	0	0	0.0	12.4	2.5	11.5	1.525	0.83903	0.004	0.30	0.009	0.013	63.096	0.013	64.818

GILT EDGE LEACH TEST COLUMN 3 ROCK SIZE -2" 0.3825 TONS
0.0518 oz/tan

CUMULATIVE CYANIDE RETURNED= SUM OF (INCHES x 0.00799 x PREG. CN lb/ton) mg/l x 0.02966 = oz per ton
CUMULATIVE Oz Au RECOVERED = SUM OF (INCHES x 0.00799 x Au Oz/ton)
CUMULATIVE % Au RECOVERED = CUM. oz REC. / 0.019825 x 100%

				BARREN					PREGNANT										
DATE	TIME	DAY	GALS	ADDED	CN gr	NaOH	pH	INCHES	pH	CN	CN RETURNED	Au	Au	Au	CUMUL. Oz	CUMUL. % Au	CUMUL. Oz	CUMUL. % Au
		TEMP	WATER	WATER	ADDED	scoops				lb/ton	CUMULATIVE pounds	oz/ton S.HILL	mg/l HAZEN	oz/ton HAZEN	Au RECOVERED S.HILL	RECOVERED S.HILL	Au RECOV HAZEN	RECOVERED HAZEN
3	11:45	32	20	15	39.8	4.5	12.4	2.75	11.5	1.45	0.87090	0.010	0.24	0.007	0.013	64.205	0.013	65.607
4	10:00	20	30	0	0	0.0	12.4	2.375	11.7	1.5	0.89936	0.010	0.21	0.006	0.013	65.162	0.013	66.203
5	10:00	30	25	0	0	0.0	12.4	3	11.7	1.35	0.93172	0.009	0.20	0.006	0.013	66.250	0.013	66.920
6	10:20	31	30	0	0	0.0	12.4	2.75	11.7	1.475	0.96413	0.005	0.19	0.006	0.013	66.804	0.013	67.545
7	10:20	32	22	10	29.2	3.0	12.4	3.625	11.7	1.375	1.00395	0.006	0.16	0.005	0.013	67.681	0.014	68.238
8	12:15	30	23	0	0	0.0	12.4	4.375	11.7	1.4	1.05289	0.005	0.13	0.004	0.014	68.562	0.014	68.918
9	10:30	20	16	20	57.6	6.0	12.4	3.125	11.7	1.475	1.08972	0.005	0.14	0.004	0.014	69.192	0.014	69.441
10	9:45	20	29.5	0	0	0.0	12.4	3.375	11.7	1.425	1.12815	0.006	0.14	0.004	0.014	69.940	0.014	70.006
11	9:50	30	25	0	0	0.0	12.4	2.125	11.6	1.3	1.15022	0.006	0.18	0.005	0.014	70.411	0.014	70.463
12	10:15	27	20	15	39.6	1.0	12	2.125	11.7	1.425	1.17442	0.006	0.15	0.004	0.014	70.882	0.014	70.864
13	11:00	34	26	0	0	0.0	12	3.375	11.6	1.525	1.21554	0.004	0.10	0.003	0.014	71.426	0.014	71.247
14	3:00	40	20	5	14.3	0.3	11.7	3.625	11.5	1.425	1.25681	0.006	0.10	0.003	0.014	72.303	0.014	71.681
15	11:30	38	20	15	42.3	1.0	11.5	2.875	11.3	1.5	1.29127	0.004	0.10	0.003	0.014	72.766	0.014	72.024
16	12:30	40	30	0	0	0.0	11.5	2.75	11	1.475	1.32368	0.003	0.10	0.003	0.014	73.044	0.014	72.353
17	10:00	28	25	10	27.4	0.0	11.2	2.5	10.7	1.5	1.35364	0.003	0.08	0.002	0.015	73.295	0.014	72.592
18	10:00	24	30	5	14.2	0.0	11	3.125	10.6	1.425	1.38922	0.002	0.09	0.003	0.015	73.547	0.014	72.928
19	12:30	32	28	5	14.3	0.3	10.9	2.5	10.6	1.475	1.41868	0.004	0.12	0.004	0.015	73.900	0.015	73.287
20	10:35	30	30	0	0	0	10.9	4.125	10.6	1.475	1.46730	0.004	0.16	0.005	0.015	74.482	0.015	74.076
21	3:00	34	23	5	12.9	0.3	10.9	3.375	10.6	1.425	1.50573	0.004	0.16	0.005	0.015	75.026	0.015	74.721
22	11:00	39	23	10	28	0.7	10.8	2.375	10.6	1.475	1.53372	0.005	0.14	0.004	0.015	75.504	0.015	75.119
23	11:05	38	28	5	14.2	0.3	10.9	2.75	10.7	1.35	1.56338	0.010	0.11	0.003	0.015	76.613	0.015	75.481
24	9:10	24	27	5	14.4	0.3	10.9	2.75	10.6	1.3	1.59194	0.003	0.1	0.003	0.015	76.990	0.015	75.809
25											1.59194			0.000	0.015	76.990	0.015	75.809
26											1.59194			0.000	0.015	76.990	0.015	75.809
27											1.59194			0.000	0.015	76.990	0.015	75.809
28	9:45	26	10	25	65.2	1.7	11.2	10.125	10.6	1.4	1.70520	0.007	0.09	0.003	0.016	79.542	0.015	76.899
29	11:40	40	27	0	0	0.0	10.7	3.625	10.4	1.225	1.74068	0.003	0.06	0.002	0.016	79.908	0.015	77.159
30	10:45	36	24	0	0	0.0	10.7	1.5	10.3	1.1	1.75386	0.002	0.1	0.003	0.016	80.028	0.015	77.338
31	11:00	34	18	15	43.2	1.0	10.7	3	10.4	1.2	1.78263	0.002	0.09	0.003	0.016	80.270	0.015	77.661
JAN 1											1.78263			0.000	0.016	80.270	0.015	77.661
1987 2	1:30	38	18	0	0	0.0	10.8	6.375	10.4	1.175	1.84248	0.008	0.06	0.002	0.016	82.326	0.015	78.118
3											1.84248			0.000	0.016	82.326	0.015	78.118
4	12:00	43	13	20	56.2	1.3	10.8	2.5	10.3	1.1	1.86445	0.002	0.08	0.002	0.016	82.527	0.016	78.357
5	12:30	36.0	26	0	0	0	10.8	3.625	10.4	1.2	1.89921	0.002	0	0.000	0.016	82.819	0.016	78.357
6	12:30	38	21				10.8	2.25	10.4	1.375	1.92393	0.002	0	0.000	0.016	83.001	0.016	78.357
7	11:30	30	17				10.8	1.125	10.3	0.975	1.93269	0.001	0.06	0.002	0.016	83.046	0.016	78.438
8	11:00	24	13				10.7	2.75	10.4	1.4	1.96345	0.003	0.07	0.002	0.017	83.351	0.016	78.668
9	2:20	35	8				10.7	2.25	10.4	1.3	1.98682	0.003	0.08	0.002	0.017	83.600	0.016	78.883
10	11:05	30	24					2.75	10.2	0.6	2.00001	0.012	0.07	0.002	0.017	84.930	0.016	79.113
11	6:00	40	16					3.875	9.8	0.3	2.00930	0.001	0	0.000	0.017	85.086	0.016	79.113
12	11:30	49	10	25				2.375	10.1	0.175	2.01262	0.001	0	0.000	0.017	85.134	0.016	79.113
13	10:35	32	30	5				2.75	10	0.175	2.01646	0.002	0	0.000	0.017	85.336	0.016	79.113
14	11:00	32	27	5				3.875	10	0.1	2.01956	0.001	0	0.000	0.017	85.473	0.016	79.113

GILT EDGE LEACH TEST COLUMN 3 ROCK SIZE -2" 0.3825 TONS
0.0518 oz/ton

CUMULATIVE CYANIDE RETURNED= SUM OF (INCHES x 0.00799 x PRES. CN lb/ton) mg/l x 0.02966 = oz per ton
CUMULATIVE Oz Au RECOVERED = SUM OF (INCHES x 0.00799 x Au Oz/ton)
CUMULATIVE % Au RECOVERED = CUM. oz REC. / 0.019825 x 100%

			BARREN					PREGNANT										
DATE	TIME	DAY TEMP	GALS WATER	ADDED WATER	CN gr ADDED	NaOH scoops	pH	INCHES	pH	CN lb/ton	CN RETURNED CUMULATIVE pounds	Au oz/ton S.MILL	Au mg/l HAZEN	Au oz/ton HAZEN	CUMUL. Oz Au RECOVERED S.MILL	CUMUL. % Au RECOVERED S.MILL	CUMUL. Oz Au RECOV HAZEN	CUMUL. % Au RECOVERED HAZEN
15	11:00	20	25.5	10				3	10	0.1	2.02195	0.000	0	0.000	0.017	85.497	0.016	79.113
16	11:30	20	27	5				3.125	9.2	0.075	2.02383	0.001	0	0.000	0.017	85.592	0.016	79.113
17	11:05	20	29					2.5	9.3	0.05	2.02483	0.001	0	0.000	0.017	85.667	0.016	79.113
18	11:00	24	26					2.75	9.2	0.05	2.02592	0.001	0	0.000	0.017	85.778	0.016	79.113
19	12:15	30	16					3.375	9.2	0.05	2.02727	0.001	0	0.000	0.017	85.846	0.016	79.113
20	10:45	25	9	5				2.875	9.1	0.0375	2.02813	0.000	0	0.000	0.017	85.846	0.016	79.113
21	11:30	24	8					2.875	9.2	0.05	2.02928	0.001	0	0.000	0.017	85.933	0.016	79.113
22											2.02928			0.000	0.017	85.933	0.016	79.113
23	4:00	32						0.375	7		2.02928	0.002	0.06	0.002	0.017	85.960	0.016	79.140
24	2:15	40									2.02928			0.015	0.017	85.960	0.016	79.140
25											2.02928			0.000	0.017	85.960	0.016	79.140
26											2.02928			0.000	0.017	85.960	0.016	79.140
27											2.02928		0.5	0.015	0.017	85.960	0.016	79.140
Totals, lbs					2.28950	0.51809					2.02928							
Totals, lbs/ton					5.98563	1.35448					5.30531							
Consumption, lbs/ton											0.68031							

03-Apr-87

GILT EDGE LEACH TEST COLUMN 4 ROCK SIZE -3/4" 0.3585 TONS
0.0582 oz/ton

CUMULATIVE CYANIDE RETURNED= SUM OF (INCHES x 0.00799 x PREG. CN lb/ton) mg/l x 0.02966 = oz per ton
CUMULATIVE Oz Au RECOVERED = SUM OF (INCHES x 0.00799 x Au Oz/ton)
CUMULATIVE % Au RECOVERED = CUM. oz REC. / 0.020859 x 100%

				BARREN					PREGNANT										
DATE	TIME	DAY	TEMP	GALS WATER	ADDED WATER	CN gr ADDED	NaOH scoops	pH	INCHES	pH	CN lb/ton	CN RETURNED CUMULATIVE pounds	Au oz/ton S.HILL	Au mg/l HAZEN	Au oz/ton HAZEN	CUMUL. Oz Au RECOVERED S.HILL	CUMUL. % Au RECOVERED S.HILL	CUMUL. Oz Au RECOV HAZEN	CUMUL. % Au RECOVERED HAZEN
OCT. 21	12:00	34		0	30	0	1.5	12	0	0.0	0	0.00000	0.000		0.000	0.000	0.000	0.000	0.000
1986 22	9:00	44		0	0	0	0.0	12	0	0.0	0	0.00000	0.000		0.000	0.000	0.000	0.000	0.000
23	10:00	43		22	0	0	0.0	12	0	0.0	0	0.00000	0.000		0.000	0.000	0.000	0.000	0.000
24	9:30	38		19	0	0	0.0	12.5	0.375	6.0	0	0.00000	0.003	0.00	0.000	0.000	0.043	0.000	0.000
25	11:00	46		14	0	0	0.0	12.5	1.625	6.0	0	0.00000		0.00	0.000	0.000	0.043	0.000	0.000
26	10:45	48		6	0	0	0.0	12.5	2.75	12.0	0	0.00000		0.00	0.000	0.000	0.043	0.000	0.000
27	10:15	44		6	10	37.8	3.0	12.5	1	12.0	0	0.00000		0.00	0.000	0.000	0.043	0.000	0.000
28	2:20	50		12	0	0	0.0	12.5	1.125	12.0	0	0.00000	0.001	0.00	0.000	0.000	0.086	0.000	0.000
29	9:00	35		6	15	41.2	4.5	12.5	2.25	12.0	0.35	0.00629	0.028	0.99	0.029	0.001	2.499	0.001	2.531
30	8:15	35		18	5	13.2	1.5	12.5	1.875	12.0	0.575	0.01491	0.065	2.30	0.068	0.001	7.168	0.002	7.430
31	10:45	44		8	10	17.7	3.0	12.5	5.5	11.7	1.15	0.06544	0.064	2.24	0.066	0.004	20.651	0.004	21.427
NOV. 1	12:00	44		17	0	0	0.0	12.2	1.25	11.5	1.05	0.07593	0.067	1.79	0.053	0.005	23.859	0.005	23.969
1986 2	11:15	46		16	0	0	0.0	12.5	0.75	11.3	0.95	0.08162	0.077	2.53	0.075	0.005	26.071	0.005	26.125
3	11:15	39		12.5	10	27.9	3.0	12.5	1.375	11.8	1.075	0.09343	0.079	2.66	0.079	0.006	30.232	0.006	30.280
4	10:30	44		19	0	0	0.0	12.3	1.75	11.6	1.2	0.11021	0.070	2.11	0.063	0.007	34.924	0.007	34.476
5	11:00	48		14	0	0	0.0	12.3	2.125	11.7	1.325	0.13271	0.048	1.61	0.048	0.008	38.831	0.008	38.363
6	9:30	46		10	20	55.7	6.0	12.5	1.875	11.8	1.275	0.15181	0.042	1.25	0.037	0.009	41.812	0.009	41.025
7	10:45	35		24	0	0	0.0	12.4	2.375	11.7	1.25	0.17533	0.025	0.92	0.027	0.009	44.041	0.009	43.508
8	3:00	34		18	0	0	0.0	12.3	2.375	11.7	1.325	0.20067	0.017	0.62	0.018	0.010	45.588	0.009	45.181
9	3:00	26		14	0	0	0.0	12.4	1.25	11.1	1.275	0.21341	0.023	0.60	0.018	0.010	46.689	0.010	46.033
10	8:45	14		12	0	0	0.0	12.4	1	10.8	1.475	0.22519	0.027	0.60	0.018	0.010	47.723	0.010	46.714
11	11:00	26		6	25	70.5	7.5	12.4	1.25	10.7	1.425	0.23943	0.024	0.86	0.026	0.010	48.872	0.010	47.936
12	11:15	25		31	0	0	0.0	12.4	0.5	10.6	1	0.24342	0.029	1.14	0.034	0.010	49.428	0.010	48.583
13	10:45	26		31	0	0	0.0	12.3	2.25	11.7	1.525	0.27084	0.039	0.79	0.023	0.011	52.789	0.011	50.603
14	10:30	39		13	15	42.2	4.5	12.4	6.875	11.4	1.4	0.34774	0.015	0.56	0.017	0.012	56.739	0.011	54.977
15	11:15	37		27	0	0	0.0	12.5	3.5	11.6	1.475	0.38899	0.029	0.78	0.023	0.013	60.627	0.012	58.078
16	1:30	41		21	0	0	0.0	12.5	3.625	11.7	1.475	0.43171	0.022	0.59	0.017	0.013	63.682	0.013	60.508
17	9:30	32		15	20	56.2	6.0	12.4	2.875	11.7	1.45	0.46502	0.015	0.54	0.016	0.014	65.334	0.013	62.272
18	11:55	32		28	0	0	0.0	12.5	3.5	11.6	1.45	0.50557	0.030	0.45	0.013	0.014	69.356	0.013	64.062
19	11:45	36		21	15	43.3	4.5	12.4	3.5	11.7	1.575	0.54961	0.009	0.35	0.010	0.015	70.562	0.014	65.453
20	10:25	35		30	0	0	0.0	12.4	3.25	11.6	1.625	0.59181	0.006	0.30	0.009	0.015	71.309	0.014	66.561
21	11:30	47		23	10	26	3.0	12.4	3.375	11.6	1.7	0.63765	0.005	0.26	0.008	0.015	71.956	0.014	67.558
22	11:00	36		28	0	0	0.0	12.4	2.625	11.7	1.725	0.67383	0.008	0.25	0.007	0.015	72.760	0.014	68.304
23	11:50	38		18	10	28.8	3.0	12.2	4.375	11.5	1.675	0.73238	0.006	0.18	0.005	0.015	73.765	0.014	69.198
24	1:00	53		17	15	43	4.5	12.3	5.75	11.6	1.55	0.80359	0.020	0.10	0.003	0.016	78.171	0.015	69.852
25	11:30	42		26	0	0	0.0	12.3	3	11.6	1.45	0.83835	0.002	0.14	0.004	0.016	78.400	0.015	70.329
26	11:30	42		20	15	39.7	4.5	12.3	3.5	11.5	1.5	0.88030	0.002	0.14	0.004	0.016	78.669	0.015	70.885
27	10:30	38		31	0	0	0.0	12.3	2.375	11.5	1.625	0.91113	0.008	0.15	0.004	0.017	79.396	0.015	71.290
28	12:00	41		24	10	29.2	3.0	12.5	3.625	11.7	1.65	0.95892	0.007	0.12	0.004	0.017	80.368	0.015	71.784
29	1:30	39		27	0	0	0.0	12.4	3.375	11.6	1.65	1.00342	0.006	0.11	0.003	0.017	81.144	0.015	72.206
30	12:15	32		21	0	0	0.0	12.4	3.25	11.7	1.575	1.04432	0.006	0.10	0.003	0.017	81.891	0.015	72.575
DEC. 1	9:50	27		19	15	43.4	4.5	12.4	1.5	11.5	1.575	1.06319	0.006	0.13	0.004	0.017	82.236	0.015	72.797
1986 2	11:05	32		28	0	0	0.0	12.4	2.875	11.6	1.65	1.10110	0.005	0.11	0.003	0.017	82.786	0.015	73.156

GILT EDGE LEACH TEST COLUMN 4 ROCK SIZE -3/4" 0.3585 TONS
0.0582 oz/ton

CUMULATIVE CYANIDE RETURNED= SUM OF (INCHES x 0.00799 x PREG. CN lb/ton) mg/l x 0.02916 = oz per ton
CUMULATIVE Oz Au RECOVERED = SUM OF (INCHES x 0.00799 x Au Oz/ton)
CUMULATIVE % Au RECOVERED = CUM. oz REC. / 0.020859 x 100%

			BARREN					PREGNANT										
DATE	TIME	DAY TEMP	GALS WATER	ADDED WATER	CN gr ADDED	NaOH scoops	pH	INCHES	pH	CN lb/ton	CN RETURNED CUMULATIVE pounds	Au oz/ton S.HILL	Au mg/l HAZEN	Au oz/ton HAZEN	CUMUL. Oz Au RECOVERED S.HILL	CUMUL. % Au RECOVERED S.HILL	CUMUL. Oz Au RECOV HAZEN	CUMUL. % Au RECOVERED HAZEN
3	11:45	32	22	10	29.9	3.0	12.4	3.25	11.6	1.675	1.14459	0.014	0.10	0.003	0.018	84.529	0.015	73.525
4	10:05	20	26	0	0	0.0	12.4	2.75	11.7	1.65	1.18085	0.008	0.08	0.002	0.018	85.372	0.015	73.775
5	10:05	30	20	0	0	0.0		3.125	11.8	1.525	1.21892	0.020	0.07	0.002	0.018	87.766	0.015	74.024
6	10:25	31	30	0	0	0.0	12.4	3	11.8	1.625	1.25788	0.001	0.07	0.002	0.018	87.881	0.015	74.263
7	10:25	32	21	10	27.7	3.0	12.4	4.125	11.8	1.475	1.30649	0.003	0.07	0.002	0.018	88.355	0.016	74.591
8	12:15	30	20	0	0	0.0	12.4	5.75	11.8	1.45	1.37311	0.002	0.06	0.002	0.019	88.795	0.016	74.983
9	10:30	20	13	20	55.7	6.0	12.4	4	11.7	1.475	1.42025	0.001	0.06	0.002	0.019	88.949	0.016	75.255
10	9:45	20	25	0	0	0.0	12.4	3.875	11.7	1.45	1.46514	0.008	0.00	0.000	0.019	90.136	0.016	75.255
11	9:55	30	20	0	0	0.0	12.4	2.875	11.8	1.375	1.49673	0.003	0.07	0.002	0.019	90.411	0.016	75.484
12	10:23	27	15	20	48.1	1.3	12	2.875	11.8	1.475	1.53061	0.025	0.08	0.002	0.019	93.164	0.016	75.745
13	11:05	34	25	0	0	0.0	12	5	11.7	1.575	1.59353	0.002	0.00	0.000	0.020	93.548	0.016	75.745
14	3:00	40	17	10	28	0.7	11.6	4	11.6	1.375	1.63748	0.002	0.00	0.000	0.020	93.854	0.016	75.745
15	11:30	38	22	10	28.3	0.7	11.4	2.75	11.2	1.45	1.66934	0.002	0.06	0.002	0.020	94.065	0.016	75.933
16	12:30	40	25	0	0	0.0	11.4	3.375	11	1.375	1.70641	0.004	0.00	0.000	0.020	94.517	0.016	75.933
17	10:00	28	20	10	27.6	0.0	11	2.875	10.7	1.35	1.73743	0.001	0.06	0.002	0.020	94.600	0.016	76.129
18	10:00	24	25	10	27.8	0.7	11	2.875	10.6	1.4	1.76959	0.001	0.06	0.002	0.020	94.655	0.016	76.325
19	12:30	32	27	5	14.2	0.3	11	3.375	10.7	1.425	1.80801		0.06	0.002	0.020	94.655	0.016	76.535
20	10:40	30	29	0	0	0.0	10.9	2.125	10.6	1.35	1.83093	0.002	0.07	0.002	0.020	94.818	0.016	76.724
21	3:00	34	21	10	28.9	0.7	11	4.125	10.6	1.475	1.87953	0.003	0.06	0.002	0.020	95.292	0.016	77.005
22	11:00	39	25	10	27.3	0.7	10.9	2.625	10.6	1.475	1.91048	0.002	0.06	0.002	0.020	95.493	0.016	77.184
23	11:10	38	28	5	12.5	0.3	10.9	3.5	10.6	1.35	1.94824	0.003	0	0.000	0.020	95.828	0.016	77.184
24	9:15	24	26	5	13.4	0.3	10.9	3.625	10.6	1.4	1.98879	0.001	0	0.000	0.020	95.967	0.016	77.184
25											1.98879			0.000	0.020	95.967	0.016	77.184
26											1.98879			0.000	0.020	95.967	0.016	77.184
27											1.98879			0.000	0.020	95.967	0.016	77.184
28	9:50	26	5	25	70	1.7	11.2	12.125	10.6	1.425	2.12684	0.011	0	0.000	0.021	101.076	0.016	77.184
29	11:40	40	22	0	0	0.0	10.7	4.375	10.5	1.35	2.17403	0.002	0	0.000	0.021	101.327	0.016	77.184
30	10:45	36	18	0	0	0.0	10.7	1.875	10.4	1.2	2.19201	0.001	0	0.000	0.021	101.399	0.016	77.184
31	11:00	34	11	25	72.1	1.7	10.7	3.75	10.4	1.475	2.23620	0.001	0	0.000	0.021	101.542	0.016	77.184
JAN 1											2.23620			0.000	0.021	101.542	0.016	77.184
1987 2	1:30	38	19	0	0	0.0	10.7	6.75	10.4	1.275	2.30497	0.008	0	0.000	0.022	103.482	0.016	77.184
3											2.30497			0.000	0.022	103.482	0.016	77.184
4	12:00	43	12	20	55.9	1.3	10.7	3.125	10.4	1.1	2.33243	0.001	0	0.000	0.022	103.577	0.016	77.184
5	12:35	36	24	0	0	0.0	10.7	4.25	10.4	1.425	2.38082	0.002	0	0.000	0.022	103.822	0.016	77.184
6	12:30	38	17				10.7	2.5	10.4	1.425	2.40928	0.001	0	0.000	0.022	103.893	0.016	77.184
7	11:35	30	16				10.7	1.625	10.5	1.225	2.42519	0.001	0	0.000	0.022	103.940	0.016	77.184
8	11:00	24	9				10.7	3.5	10.4	1.575	2.46923	0.003	0	0.000	0.022	104.342	0.016	77.184
9	2:30	35	3	30				2.75	10.4	1.425	2.50055	0.009	0	0.000	0.022	105.290	0.016	77.184
10	11:15	30	23					3.25	10.3	0.95	2.52521	0.002	0	0.000	0.022	105.477	0.016	77.184
11	6:00	40	12					4.875	10.3	0.525	2.54566	0.001	0	0.000	0.022	105.570	0.016	77.184
12	12:00	49	7	25				2.875	10.2	0.3375	2.55342	0.003	0	0.000	0.022	105.846	0.016	77.184
13	10:40	32	25	10				3.25	10	0.25	2.55991	0.001	0	0.000	0.022	105.939	0.016	77.184
14	11:15	32	26	10				4.625	10.1	0.175	2.56638	0.000	0	0.000	0.022	105.963	0.016	77.184

BILT EDGE LEACH TEST COLUMN 4 ROCK SIZE -3/4" 0.3585 TONS
0.0582 oz/ton

CUMULATIVE CYANIDE RETURNED= SUM OF (INCHES x 0.00799 x PREG. CN lb/ton) mg/l x 0.02966 = oz per ton
CUMULATIVE Oz Au RECOVERED = SUM OF (INCHES x 0.00799 x Au Oz/ton)
CUMULATIVE % Au RECOVERED = CUM. oz REC. / 0.020859 x 100%

			BARREN					PREGNANT										
DATE	TIME	DAY TEMP	GALS WATER	ADDED WATER	CN gr ADDED	NaOH scoops	pH	INCHES	pH	CN lb/ton	CN RETURNED CUMULATIVE pounds	Au oz/ton S.HILL	Au mg/l HAZEN	Au oz/ton HAZEN	CUMUL. Oz Au RECOVERED S.HILL	CUMUL. % Au RECOVERED S.HILL	CUMUL. Oz Au RECOV HAZEN	CUMUL. % Au RECOVERED HAZEN
15	11:05	20	28	5				3.875	10.1	0.15	2.57102	0.000	0	0.000	0.022	106.043	0.016	77.184
16	11:30	20	24	10				3.875	9.6	0.1	2.57412	0.000	0	0.000	0.022	106.080	0.016	77.184
17	11:20	20	29					3	9.6	0.125	2.57711	0.006	0	0.000	0.022	106.798	0.016	77.184
18	11:00	24	22					3.25	9.6	0.1	2.57971	0.000	0	0.000	0.022	106.829	0.016	77.184
19	12:15	30	14					3.875	9.5	0.1	2.58280	0.000	0	0.000	0.022	106.889	0.016	77.184
20	10:45	25	6	5				3.25	9.5	0.075	2.58475	0.000	0	0.000	0.022	106.889	0.016	77.184
21	11:30	24	4					3.5	9.5	0.075	2.58685		0	0.000	0.022	106.889	0.016	77.184
22											2.58685			0.000	0.022	106.889	0.016	77.184
23	4:00	32						0.625	8.2	0.025	2.58697	0.001	0	0.000	0.022	106.919	0.016	77.184
24	2:15	42									2.58697			0.000	0.022	106.919	0.016	77.184
25											2.58697			0.000	0.022	106.919	0.016	77.184
26											2.58697			0.000	0.022	106.919	0.016	77.184
27											2.58697		0	0.000	0.022	106.919	0.016	77.184
Totals, lbs					2.60851	0.59415					2.58697							
Totals, lbs/ton					7.27618	1.65731					7.21611							
Consumption, lbs/ton											0.06007							

To: Jim

TABLE A

COLUMN LEACH TEST RESULT SUMMARY
GILT EDGE PROJECT

CUMULATIVE GOLD EXTRACTION (%)

TIME (Days)	Column #1 As Received	Column #2 - 4 inch	Column #3 - 2 inch	Column #4 -3/4 inch
1	-	-	-	-
5	1.69	-	-	-
10	7.37	2.15	0.35	7.43
15	15.73	8.78	15.12	34.48
20	22.24	14.67	28.19	46.03
25	26.85	28.59	39.22	54.98
30	33.27	38.47	50.47	65.45
35	39.18	42.69	58.08	69.85
40	43.70	46.74	62.66	72.21
45	47.31	49.40	66.20	73.78
50	53.05	52.26	69.44	75.26
55	56.71	55.62	71.68	75.75
60	58.90	57.61	73.29	76.56
65	60.95	61.65	75.81	77.18
70	61.86	63.45	77.16	77.18
75	63.15	65.66	78.12	77.18
80	64.41	67.88	78.67	77.18
85	66.30	70.27	79.11	77.18
90	68.38	71.50	79.11	77.18
95	69.16	72.47	79.14	77.18
99	69.16	73.01	79.14	77.18
Cum Au extracted oz/ton	.036	.038	.042	.045
Assay Head oz/ton	.041	.065	.050	.068
Calculated Head oz/ton	.051	.052	.052	.058
Au Recovery %	70.6	73.1	80.8	77.6
Cyanide Consumption lb/ton	.499	.432	.680	.060
Lime Added lbs	3.0	3.0	1.0	1.0
NaOH Added lbs	1.05	1.30	.52	.59

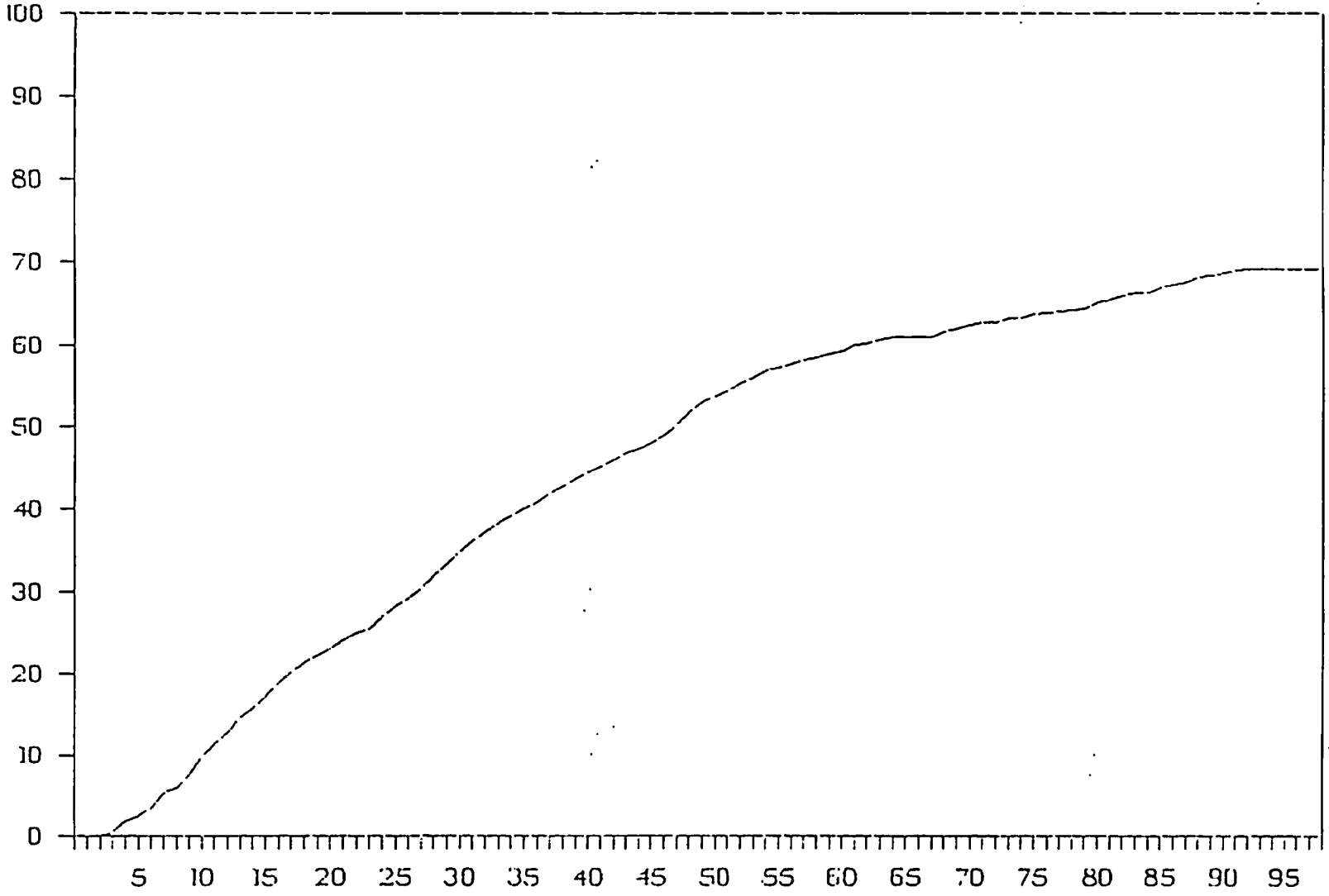
TABLE B

GILT EDGE PROJECT
COLUMN LEACH TESTS
RECOVERY BY SIZE FRACTION

SCREEN SIZE	ASSAY OZ/TON		%Au DIST		Au REC
	FEED	RESIDUE	FEED	RESIDUE	%
COLUMN #1 AS RECEIVED					
6" x 4"	.010	.012	5.4	3.4	NEG
4" x 2"	.012	.008	0.7	6.5	33.3
2" x 1"	.022	.009	7.7	8.2	59.1
1" x 3/4"	.060	.009	8.7	4.0	85.0
3/4" x 1/4"	.048	.012	26.5	14.2	75.0
- 1/4 "	.068	.019	51.0	64.7	71.2
TOTAL	.041	.014	100.0	100.0	65.9
COLUMN #2 - 4 INCH:					
4" x 2"	.028	.010	8.3	12.8	64.3
2" x 1"	.058	.009	7.4	25.1	84.5
1" x 3/4"	.042	.006	3.3	6.4	85.7
3/4" x 1/4"	.054	.007	20.8	11.4	87.0
- 1/4"	.092	.016	60.2	51.3	82.6
TOTAL	.065	.012	100.0	100.0	81.5
COLUMN #3 - 2 INCH:					
4" x 2"	.016	.011	2.8	5.8	31.3
2" x 1"	.036	.008	22.4	25.1	77.8
1" x 3/4"	.046	.008	7.3	6.4	82.6
3/4" x 1/4"	.036	.005	18.1	11.4	86.1
- 1/4"	.090	.011	49.4	51.3	87.8
TOTAL	.050	.009	100.0	100.0	82.0
COLUMN #4 - 3/4 INCH:					
1" x 3/4"	.022	.008	0.5	1.1	63.6
3/4" x 1/4"	.044	.009	27.1	26.1	79.5
- 1/4"	.096	.015	72.4	72.8	84.3
TOTAL	.068	.013	100.0	100.0	80.9

BROHM MINING CORP.

GILT EDGE LEACH TEST - COLUMN 1

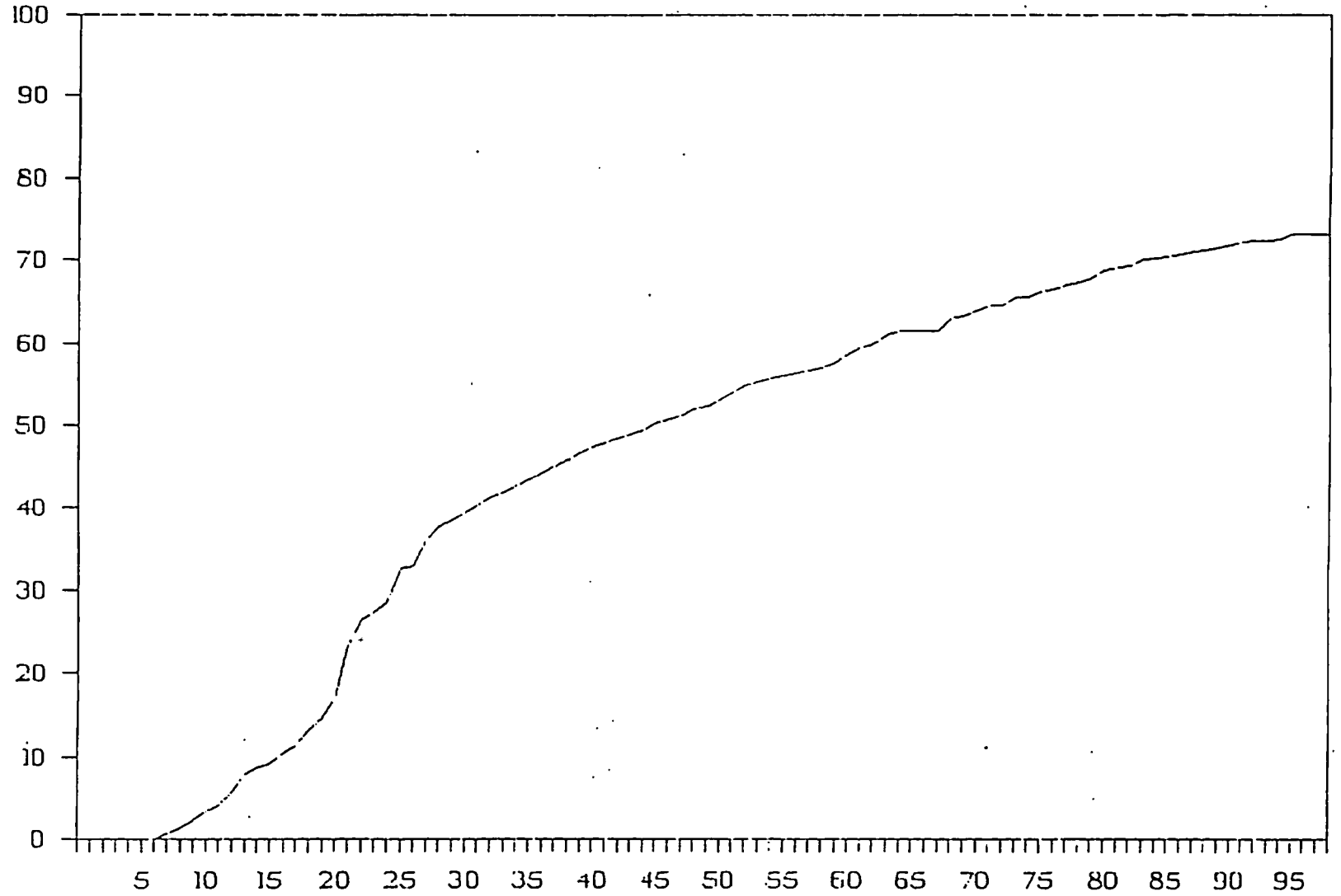


GRAPH #1

Mark 9/97

BROHM MINING CORP.

GILT EDGE LEACH TEST - COLUMN 2

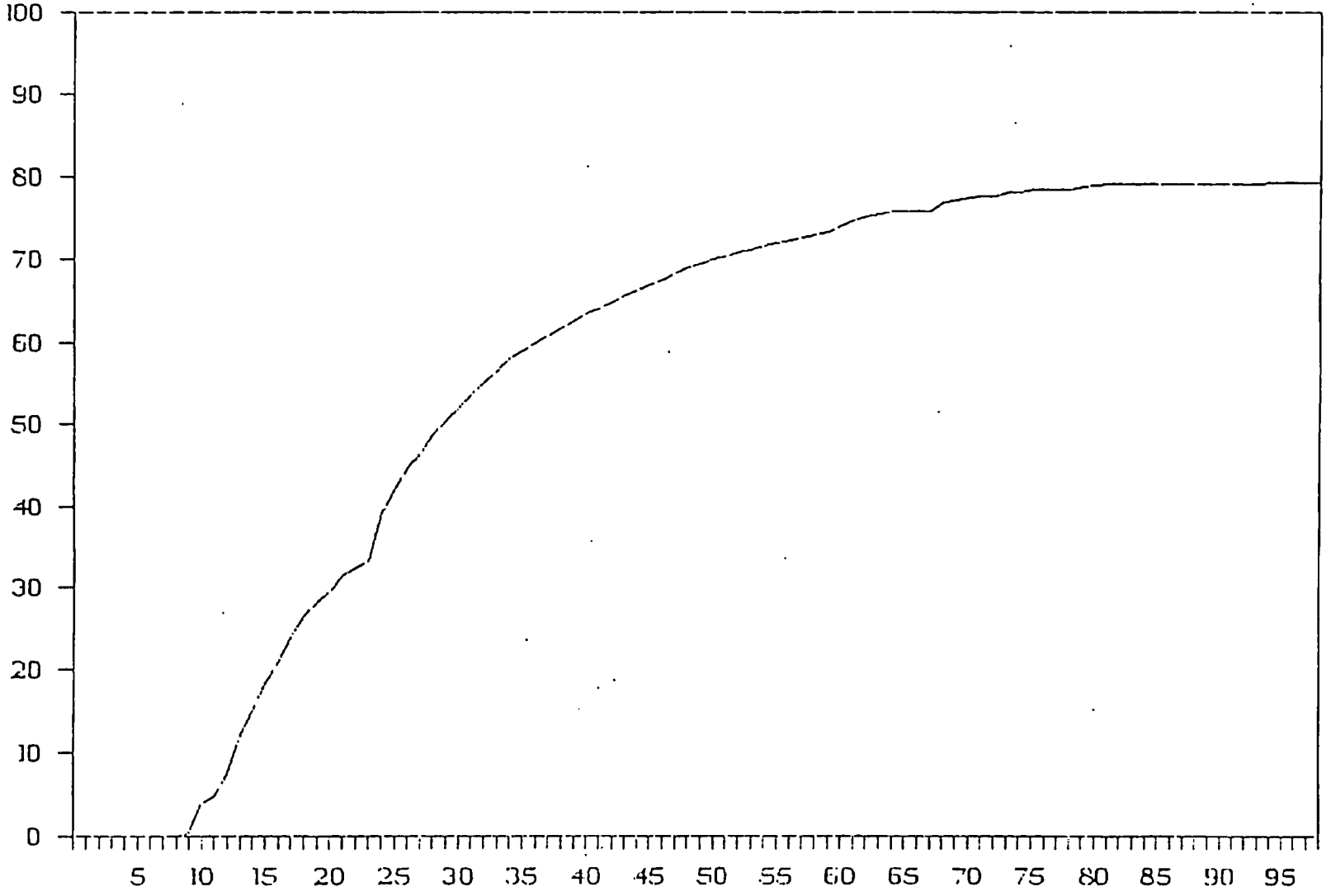


GRAPH #2

Mark 9/87

BROHM MINING CORP.

GILT EDGE LEACH TEST - COLUMN 3

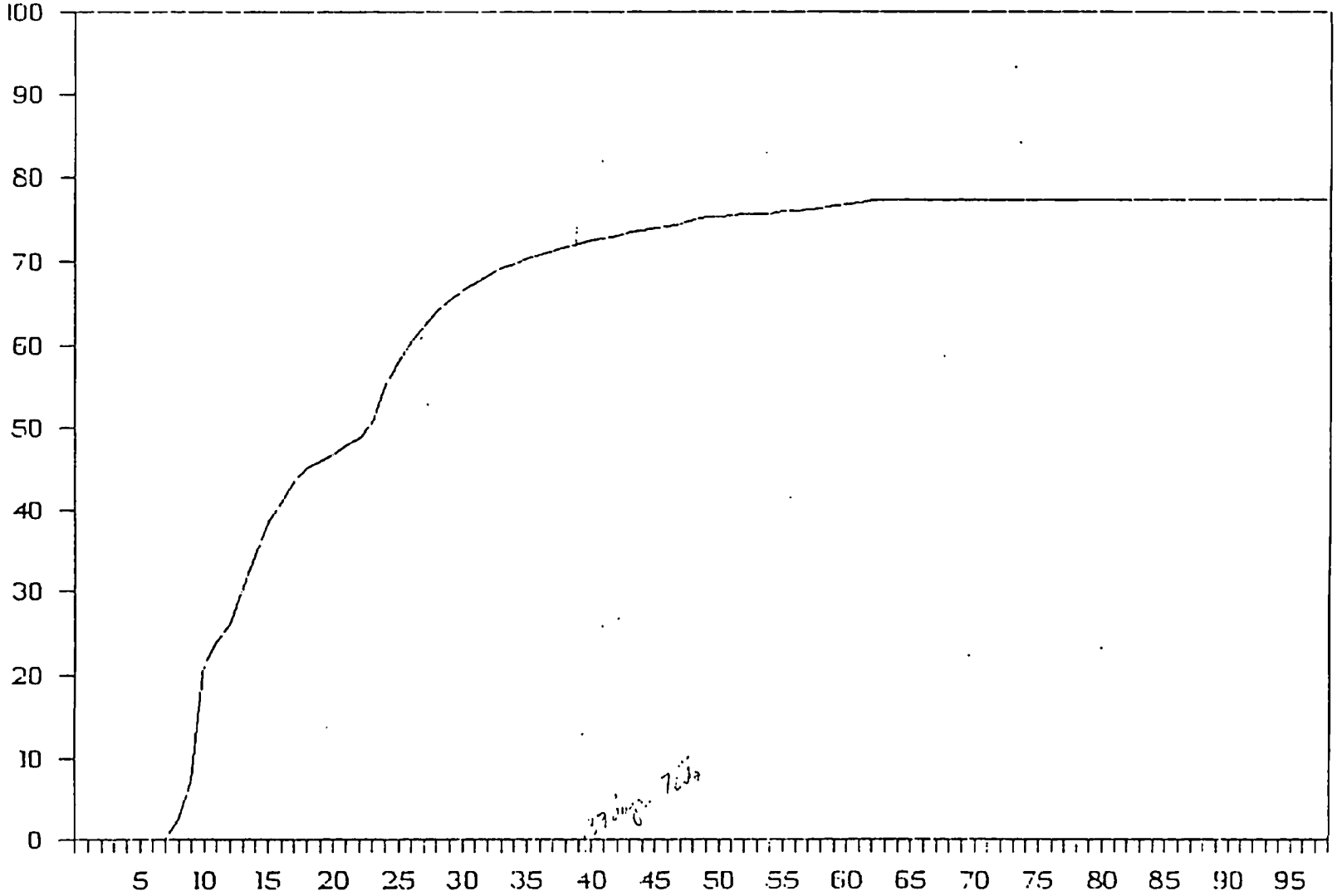


GRAPH #3

Mark 7/97

BROHM MINING CORP.

GILT EDGE LEACH TEST - COLUMN 4

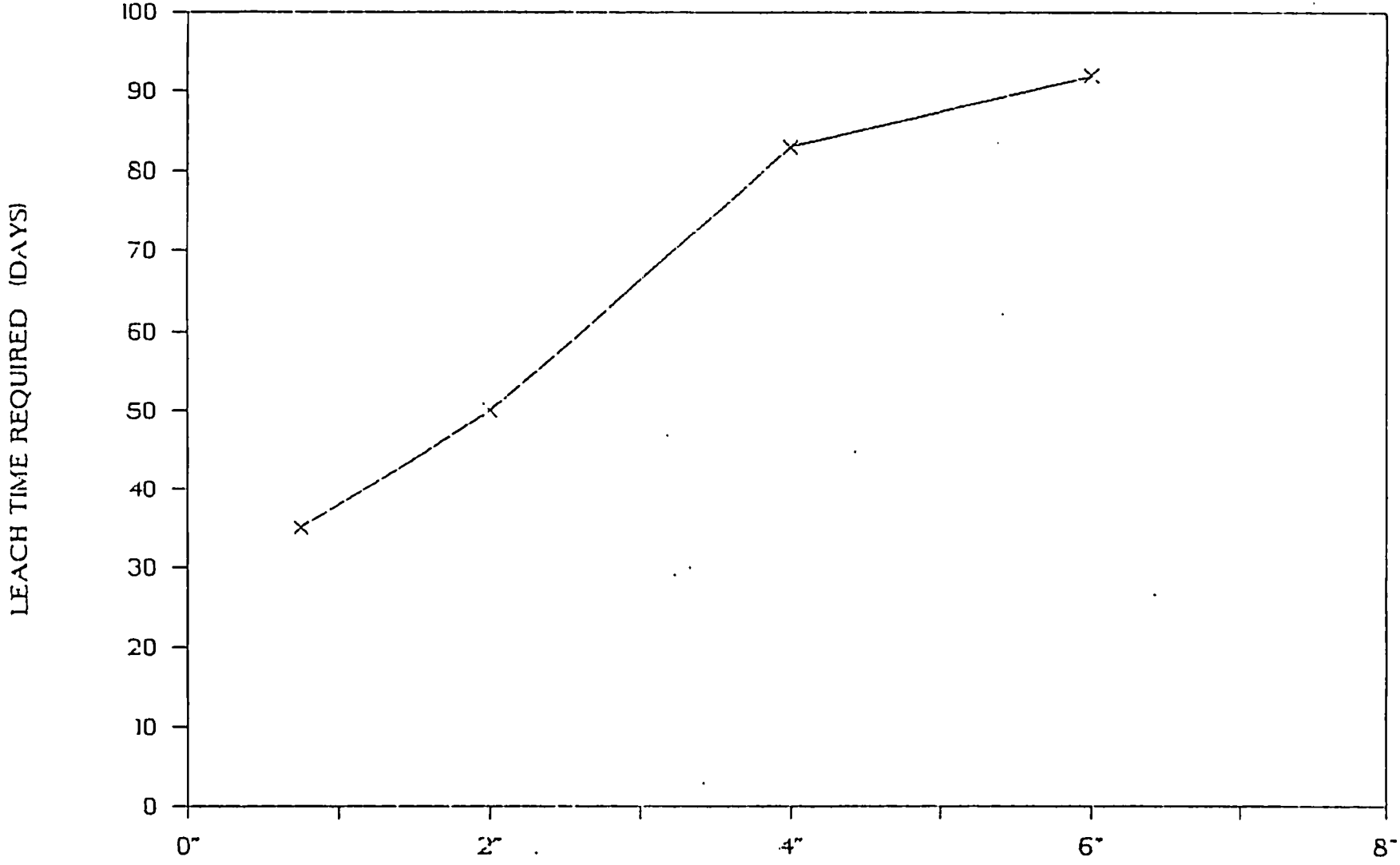


GRAPH #4

March 9/97

LEACH TIME REQUIRED

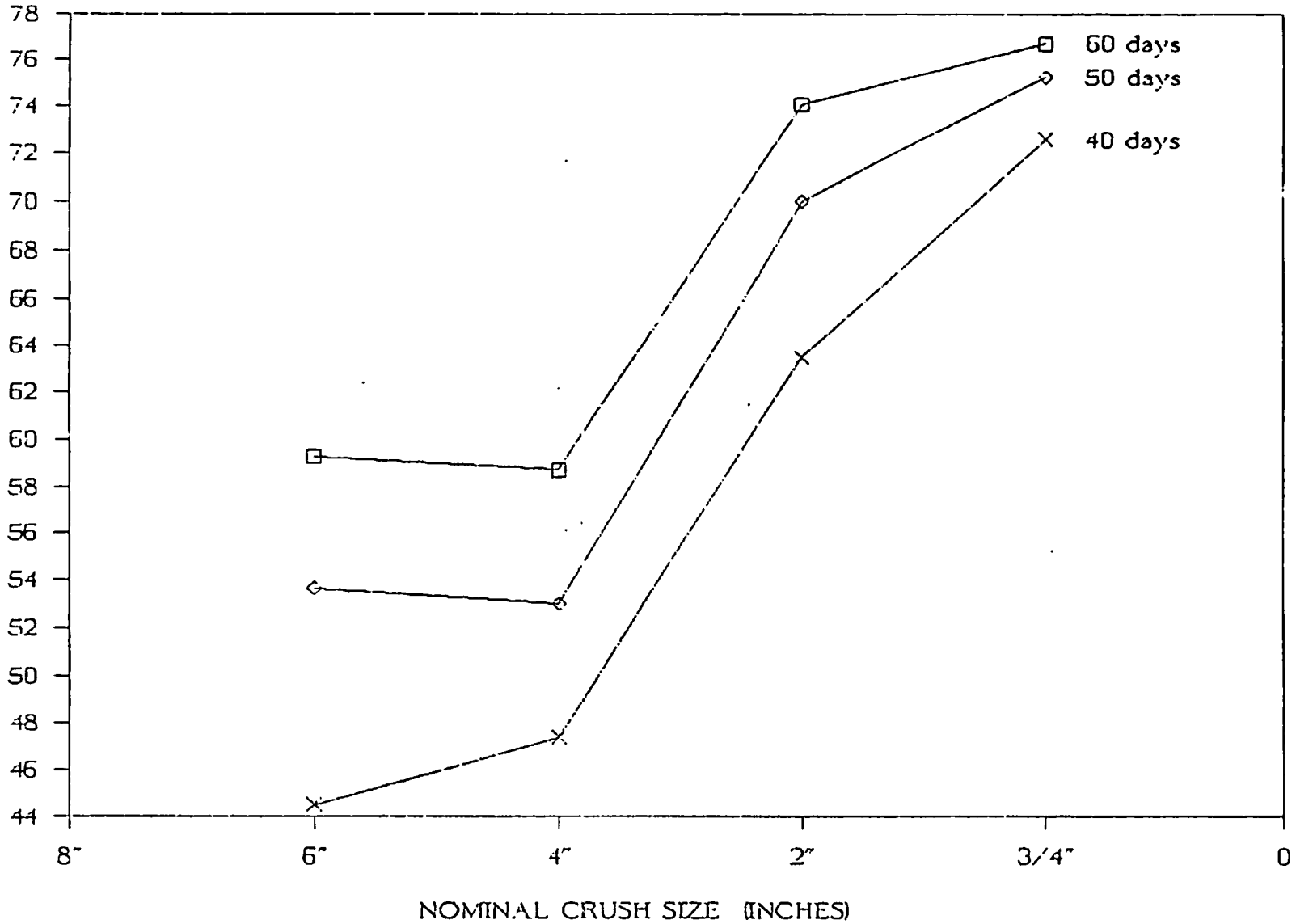
TO OBTAIN 70% AU RECOVERY



GRAPH #5

RECOVERY vs CRUSH SIZE

AT VARIOUS LEACH PERIODS



GRAPH #6

Coast Credit
Commercial Finance Group
800-558-7198
November 5, 2020

Denver, CO
Approved Line: $72,653
Applied Rate: 3.648% fixed
Client ID #: 3033126339

Environmental Protection Agcy

With a business line of credit, you will have access to the working capital you need when you need it most. Simply request funds via a quick call, or transfer money into your account using your Online Account. Our business line of credit has no cost to set up can help you bridge the gap between payables and receivables, temporarily fund payroll, or purchase inventory. Our commercial lines are based on the business profile and not on personal to help build your business credit.

EASY

- Approved Options within 1 hour
- No Upfront Fees

QUICK

- Funds within 24 hours

REPAYMENT

- No Daily Payments
- Terms: 6 months – 10 years
- No Prepayment Penalty
- 50k – 350k Available

Draw as little or as much as you want from your available credit. Your credit line replenishes as you make repayments.

Call now to review your options.

This offer expires in 5 days.

Coast Credit Union
Commercial Finance Group
800-558-7198